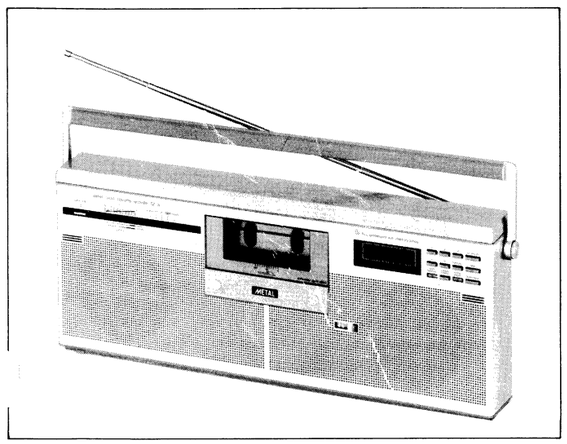
SHARP SERVICE MANUAL

GF-8H/HL/E

SM980147RCS



APSS
Auto Program Search System

MODEL GF-8H/HL/E

"In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified by used."

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SHARP CORPORATION OSAKA, JAPAN

SPECIFICATIONS

GENERAL DESCRIPTION

Power Source:	DC 9V (6 x UM/SUM-1, R20, HP-2 Batteries) or other DC external supply.	
	3V (2 x UM/SUM-3, R6 or HP-7 batteries for microprocessor)	
Output Power:	MPO 6.4W (3.2W + 3.2W) using AC adaptor	
	RMS 5W (2.5W + 2.5W) on DC 10% distortion	
Speakers:	9.2cm x 2. Cone Type	
Semi-conductors:	1-LSI	
	13 IC's	
	1 Hall IC	
	46 Transistors	
	3 FET's	
	53 Diodes	
	11 LED's	
Dimensions:	Width;	396 mm
	Height;	165 mm
	Depth;	69.5 mm
Weight:		2.8 kg. (no batteries)

TAPE RECORDER SECTION

Tape:	Philips Type Cassette Tape
Frequency Response:	40 Hz –16000 Hz (Metal Tape)
	40 Hz –12000 Hz (Normal Tape)
S/N Ratio:	50 dB
Input Impedance:	
Mix Mic.:	600 ohms
Ext Mic.;	600 ohms
DIN-Input;	0.1mV/K ohms
Loaded Impedance	
Headphones;	8 ohms to 32 ohms
External Speaker;	4 ohms to 8 ohms

RADIO SECTION

Frequency Range	
LW;	155 kHz –281 kHz (9 kHz intervals)
MW;	531 kHz –1602 kHz (9 kHz intervals)
FM;	87.5 MHz –108.0 MHz (0.05 MHz intervals)

MANUFACTURER'S NOTE

The manufacturer of this Unit reserves the right to change the specifications, materials of production, and the design of the Unit. However any such alternations will not impair the quality of construction or grade of performance.

DISASSEMBLY

Prior to the disassembling, be sure to remove the batteries, AC adaptor, and all the connection leads from the set. Also take a cassette tape out if found in the compartment.

■ REMOVAL OF CABINETS

① Open the controls compartment lid on the top of the set, push the lid backwards by disconnecting the two (2) stoppers between it and the cabinet, and take the six (6) knobs away from the cabinet.
② Remove the battery compartment lid from the rear cabinet.
③ Remove the seven (7) screws from the cabinet.
④ Detach the front cabinet from the rear cabinet: at the time, be careful to leave the connectors, connected between both cabinets, as they are.
⑤ Disconnect the two sockets at the top and rear cabinets from each other. Then both cabinets can be separated completely.

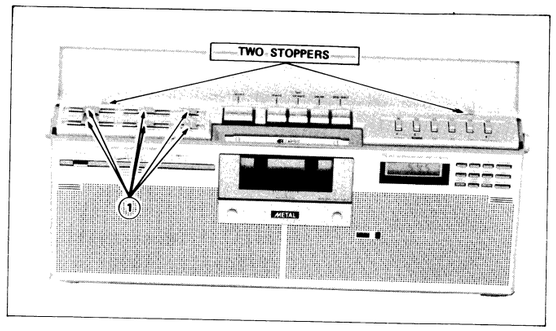


Figure 3–1

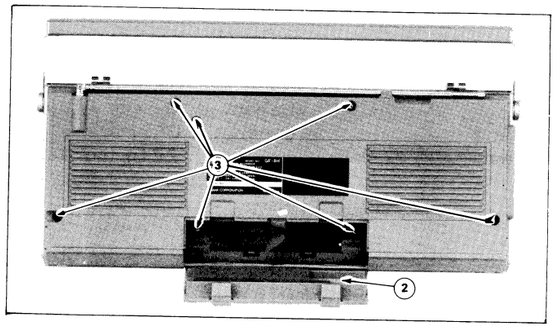


Figure 3–2

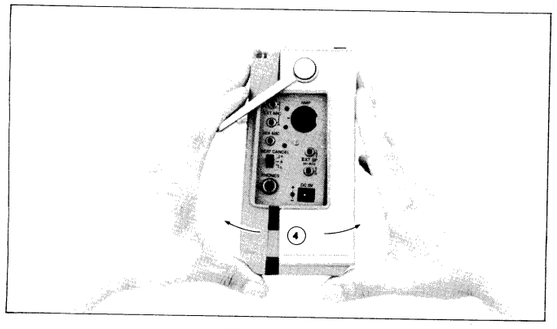


Figure 3–3

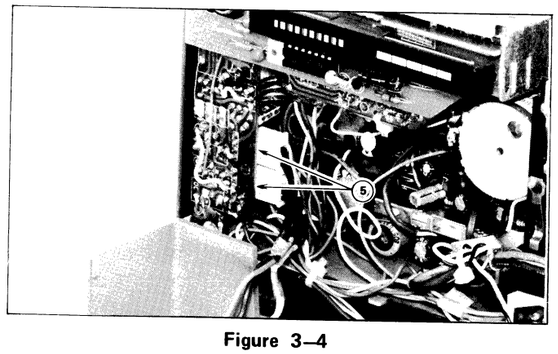


Figure 3–4

■ REMOVAL OF MECHANISM BLOCK

① Disconnect the capacitor from wire holder and LCD bracket.
② Disconnect the four (4) sockets from their respective PWBs.
③ Remove the three (3) screws from the mechanism block. Then the mechanism block can be separated from the rear cabinet.

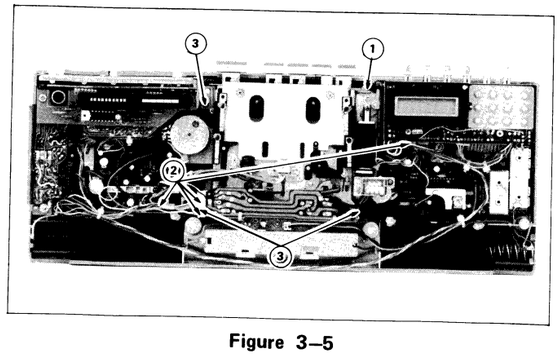


Figure 3–5

■ REMOVAL OF PWB BLOCK

Prior to this removal, be sure to disconnect the capacitor from between the battery (negative side) and MW/LW tuner's shield plate.
① Remove the two (2) leads holding band by using a nippers.
② Remove the four (4) screws.
③ Unsolder the two (2) leads from where.
④ Disconnect the antenna socket from the rear cabinet.
⑤ Disconnect the one (1) socket. Then the PWB block can be separated from the rear cabinet.

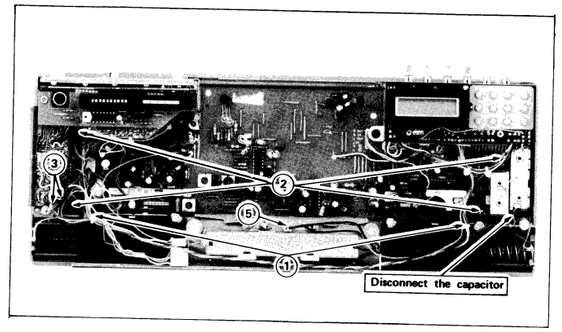


Figure 4–1

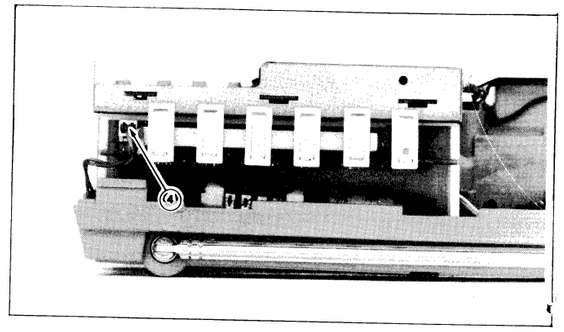


Figure 4–2

■ REMOVAL OF DISPLAY PWB

① Disconnect the two (2) sockets.
② Remove the two (2) screws, then the display PWB can be separated from the PWB block.

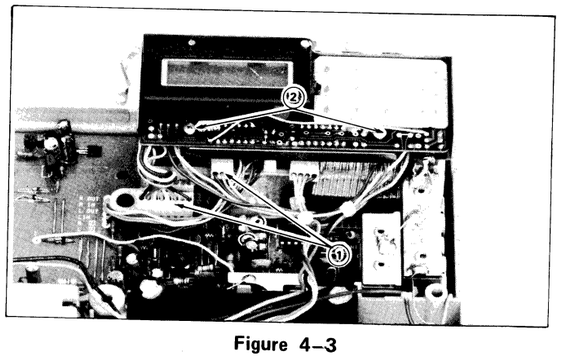


Figure 4–3

■ REMOVAL OF SWITCH PWB

(Refer to Fig. 4–4, 5–1, 5–2, 5–3)
① Withdraw the two (2) push-rivets from the front of the switch PWB.
② Unsolder the flat cable (at 13 portions on the printed circuit line), and take it away from the PWB block.
③ Remove the lead wire which are soldered to the shield plate of MW/LW tuner unit.
④ Disconnect the one (1) socket from the switch PWB.
⑤ Holding the PWB block with hands as shown in Fig. 5–2, slide the switch PWB to right and remove by lifting it up.
⑥ Remove the two (2) screws form the switch PWB, then the switch PWB can be separated from the PWB block.

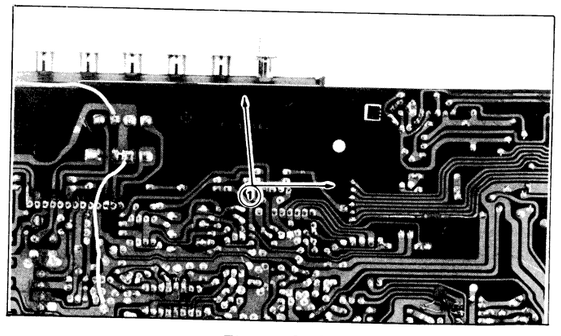


Figure 4–4

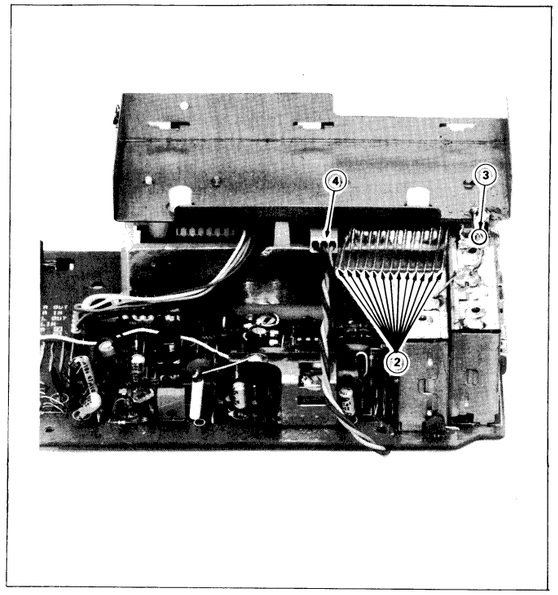


Figure 5–1

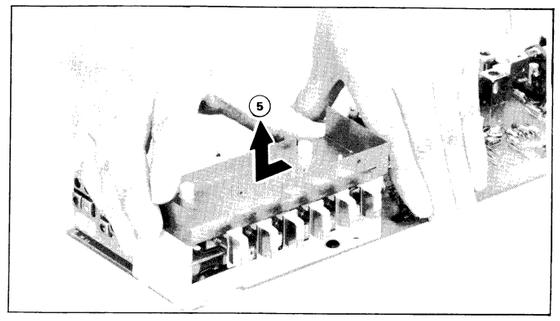


Figure 5–2

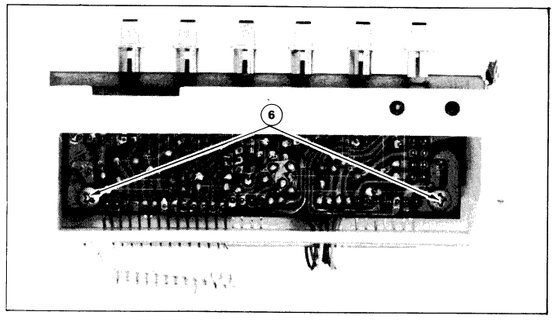


Figure 5–3

■ REMOVAL OF LED PWB

① Remove the one (1) screw and spacer.
② Remove the one (1) screw from the jack plate.
③ Turn the LED PWB over, and unsolder the two (2) flat cables (at 12 portions).
Then the LED PWB can be separated from the PWB block.

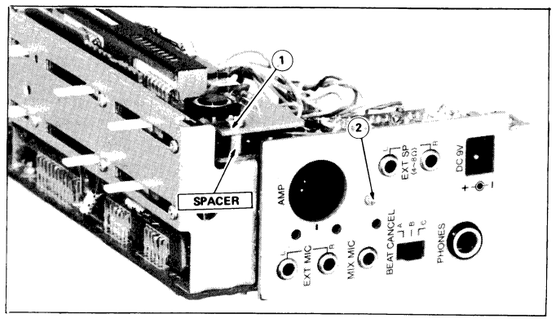


Figure 5–4

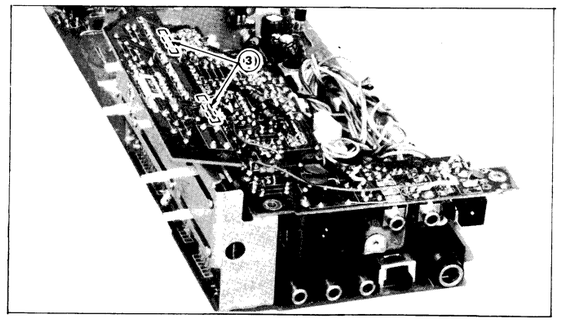


Figure 5–5

■ REMOVAL OF JACK PWB

① Unsolder the three (3) flat cables (at 12 portions).
② Unsolder the eleven (11) leads from where the jack PWB is positioned.
Then the jack PWB can be separated from the PWB block.

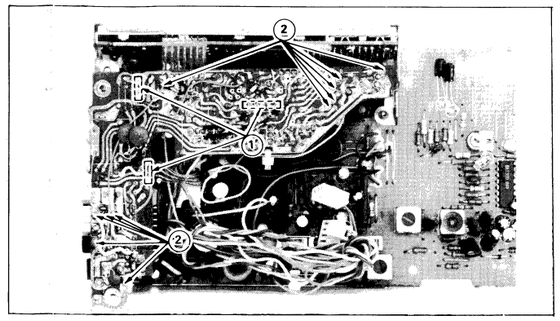


Figure 6–1

■ REMOVAL OF VOLUME PWB

① Remove the four (4) screws from the controls bracket.
② Unsolder the leads from the main PWB (at 24 portions).
Then the volume PWB cna be separated from the main PWB.
③ Remove the six (6) screws from the controls bracket, them the controls PWB can be separated from the PWB block.

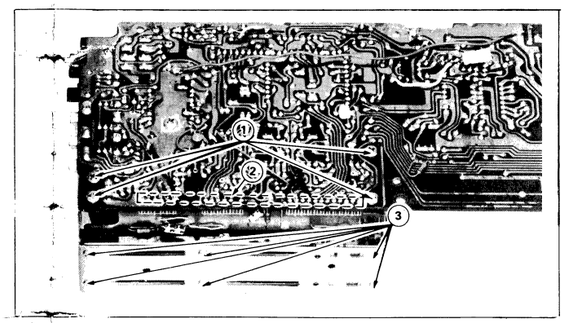
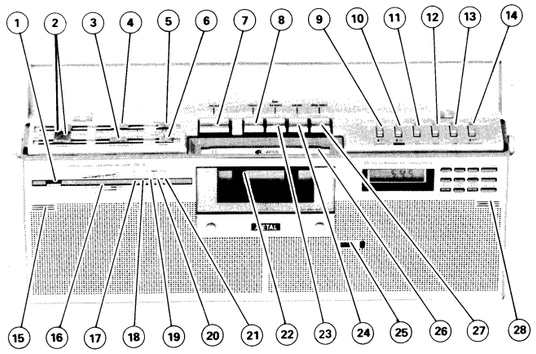
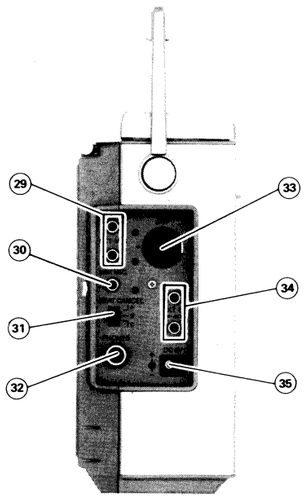
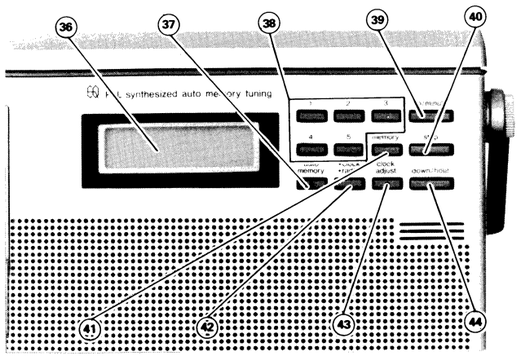


Figure 6–2

LAYOUT OF PARTS







(1) Battery Check/Dial Illumination
(2) Volume Control
(3) Microphone Input Control
(4) Tone Control
(5) Tape Selector
(6) Stereo Mode Selector
(7) Record Key
(8) Rewind Key
(9) Power Switch
(10) APSS Switch
(11) FM Switch
(12) MW Switch
(13) LW Switch
(14) Radio Sensitivity Switch
(15) Built-in Microphone (Left)
(16) VU-Battery Condition Meter
(17) Power Indicator
(18) FM Stereo Indicator
(19) Recording Indicator
(20) APSS Indicator
(21) Station Tuning Indicator
(22) Cassette Compartment
(23) Fast-forward Key
(24) Pause Key
(25) Tape Counter
(26) Cassette Compartment Lid
(27) Stop/Eject Key
(28) Built-in Microphone (Right)
(29) External Microphone Socket
(30) Mixing Microphone Socket
(31) Beat Cancelling Switch
(32) Headphones Socket
(33) DIN Type Input/Output Socket
(34) External Speaker Socket
(35) DC 9V Jack
(36) Multi-Display Panel
(37) Auto memory Button
(38) Preset Memory Tuning Button
(39) Up/Minute Button
(40) Time Adjustment/APMS/Station Scanning Stop Button
(41) Memory Button
(42) Clock-Radio Button
(43) Clock Adjust Button
(44) Down/Hour Button

Figure 7

CIRCUITRY DESCRIPTION

Outline:
The tuner of this set is a new electronic-controlled tuner that employs varactors at its front end instead of variable capacitors used in the conventional cassette tape recorder (with built-in radio).
In the conventional tuner, a dial knob must be turned to make the capacitance of variable capacitor vary according to a station frequency that you want to tune in. But with this new type of tuner, all you have to do is merely to touch the station memory button in which the desired station frequency is memorized, then the varactor's voltage will change to allow the set to tune in that frequency perfectly: at the time, the tuned frequency is displayed on the digital indicator.
To put this advantage to practical use, an accurately tuning circuit (PLL circuit) is indispensable, and it is also necessary to use with it an automatic tuning stop circuit which stops the scanning the moment the set has tuned in FM or MW · LW station as you desired.

■ AUTO STOP (Automatic Scanning Stop) CIRCUIT

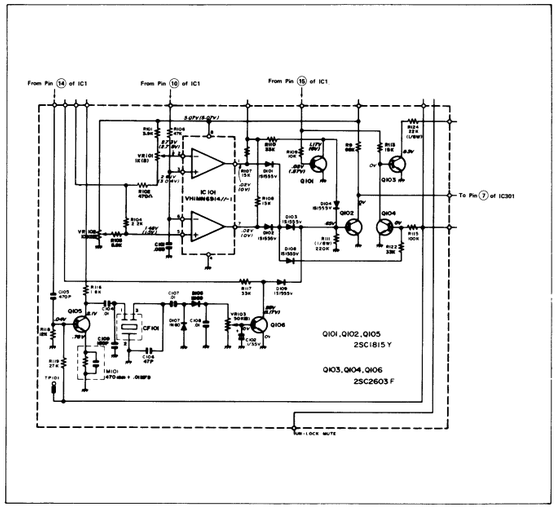


Figure 8–1

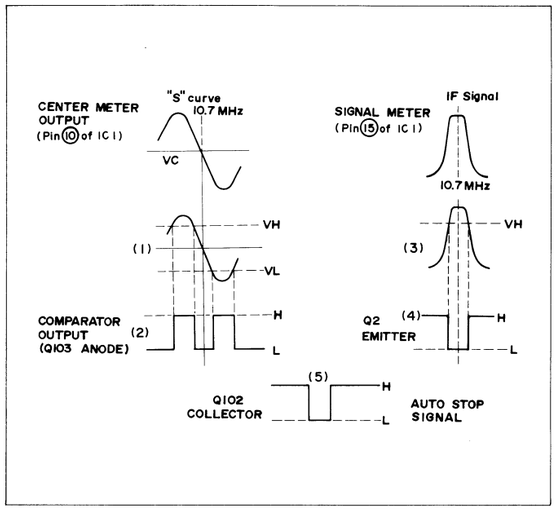


Figure 8–2

• **In the case of FM reception** (See Figs. 8–1 and 8–2)
In order for the set to tune in the desired FM station perfectly and stop the scanning just there, there are two signals: one the output at pin (15) (for the signal meter) and another the output at pin (10) (for the center meter), both pins belonging to the intermediate frequency (IF) amplifier (IC1).
When the set tunes in a station during the automatic scanning, IF signal is caused at pin (5) of the FM tuner unit and it enters pin (1) of the IF amplifier (IC1). Simultaneously there are produced two signals at pin (10) and (15) of the said IC1, respectively: the former is S-curve signal shown in Fig. 8–2–(1) and the latter is IF signal shown in Fig. 8–2–(3), both of which will be processed the way we will next explain. The S-curve signal is applied to the comparator (IC101) and here it is shaped in its waveform through the reference voltage (V_H or V_L) induced by the comparator itself: Fig. 8–2–(2) shows what the well-shaped output is like, which is the output at the anode of D103. And the Table 1 below illustrates how it becomes "High" or "Low" level according to the potentional relationship which is set up between the output at pin (10) and the reference voltage.
The V_H has to be approx. 2.3 V (at pin (3) of IC101) and the V_L to be approx. 1.9 V (at pin (5) of IC101). As the result of this voltage setting even if a different station comes to be very adjacent to the desired station during the FM automatic scanning, these two will never be confused with each other: this is because the auto stop signal is made alive at the point which is detuned ±40 kHz away from the desired IF signal that the set has to tune in, so that only the desired station comes into being just after the end of automatic scanning. In addition, if the automatic scanning stop circuit is put in action only by the signal of Fig. 8–2–(2), the auto stop function works not only at the tuning point but within the range of complete detuning. To prevent this malfunction, the IF signal (at pin (15) of IC1) shown in Fig. 8–2–(3) is applied to Q2, and through Q101 and D104 the logical sum (OR) of it and the S-curve signal is fed into Q102. The auto stop signal of Fig. 8–2–(5) then enters the microcomputer (pin (7) β of IC301) to put the auto stop function in motion at just the tuning point.

Output at pin (10)	$V_H > V_C$	$V_H > V_C > V_L$	$V_C > V_L$
Reference voltage	V_H ($^{10.7MHz}_{+40kHz}$)		V_L ($^{10.7MHz}_{-40kHz}$)
Comparator's output	"High"	"Low"	"High"

Table 1

- **In the case of MW/LW reception**
  (See Figures 8–1 and 9–1)

If an MW or LW broadcast signal, during the automatic scanning, is tuned in, it is applied to the MW/LW tuner unit to go out of pin ⑤ as an IF signal. This MW/LW tuner unit consists of RF amplifier circuit, local oscillation circuit and IF circuit all of which are integrated into a signal unit, which is important in helping a compactness of the set configuration. The IF signal coming from pin ⑤ of the MW/LW tuner unit arrives via the ceramic filter (CF1) at pin ⑯ of IC1, then it enters the AM IF (1) circuit of this IC to go out of pin ⑭ as an auto scan, stop signal. This auto scan stop signal is delivered via the 450 kHz filter (T1) to the transistor (Q105), and here it is amplified to enter the ceramic filter (CF101) characteristic of high selectivity, and then it is rectified by the voltage doubler rectifier made of diodes (D106 and D107) to turn on the transistor (Q106): the control (VR103) located between the voltage doubler rectifier and the transistor (Q106) is for the purpose of MW/LW auto stop adjustment which is shown in Fig. 20–1.

Now the transistor (Q106) is kept turned on, and so the anode of diode (D109) becomes zero (0) potential and voltage at the base of transistor (Q102) is cut off to the turn it off. +B power accordingly is induced at the collector of transistor (Q102), and it passes through the IC (IC302) of NAND gate logic to be applied as a low-level pulse to pin ⑦ of the microcomputer (IC301) which then causes the set to stop the automatic scanning of MW/LW signal as it is tuned in.

Pins ⑥ and ⑧ of the MW/LW tuner unit are designed to have different potential from each other according to whether the set is tuning in MW or LW signal, like this:

In MW reception: 0 potential at pin ⑥ and +B potential at pin ⑧ .

In LW reception: +B potential at pin ⑥ and 0 potential at pin ⑧ .

■ PLL CIRCUIT (See Fig. 9–2)

PLL is an abbreviation of Phase Locked Loop, and it compares the phase of the input signal with that of the reference signal so that the input is locked to the frequency accurate enough to allow the set to enjoy the more exact tuning. Fig. 9–2 is its basic block diagram having the following three flocks in it.

1. VCO: Voltage-controlled oscillator
2. PC: Phase comparator
3. LPF: Low-pass filter

The phase comparator performs phase comparison of the input signal (fo) with the reference signal (fr) to generate a control signal according to their phase difference. The control signal then enters the low-pass filter where it is cleared of high-frequency component and noise to result in a signal that consists only of direct current element to be fed into the voltage-controlled oscillator. The loop is so constituted that this direct current component makes a phase delay if fo is ahead of fr and makes a phase advance if fo is behind fr so that the voltage-controlled oscillator can keep the phase difference to be always 90 degrees.

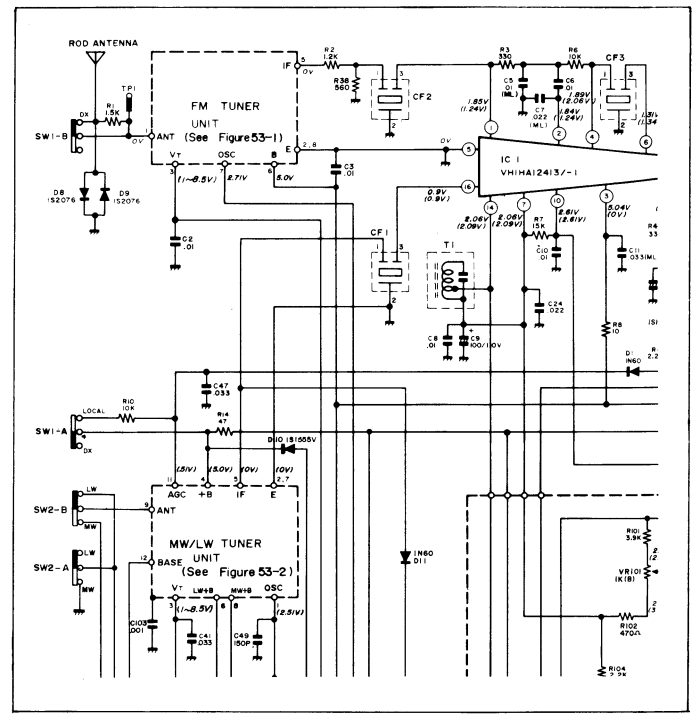


Figure 9–1

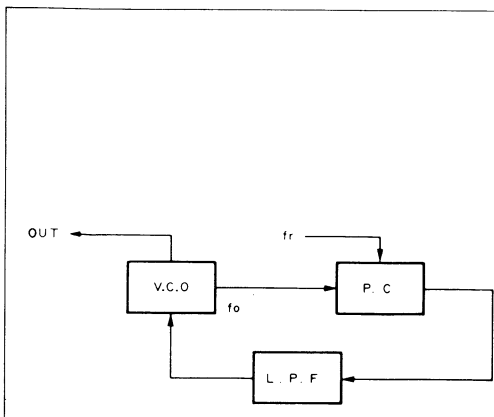


Figure 9–2

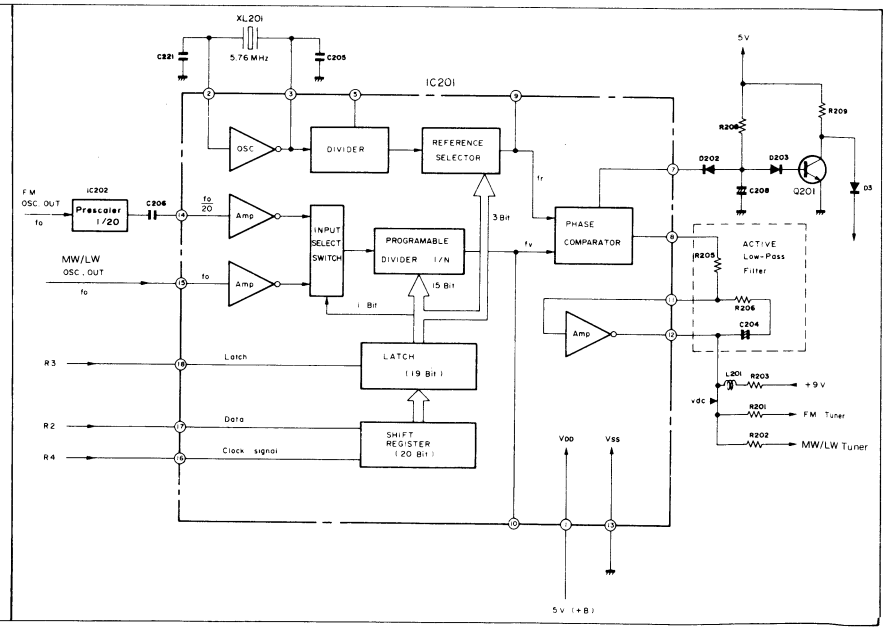


Figure 9–3

■ PRESCALER IC (IC202)

This is used because when the local oscillator output (fo) of the FM tuner unit is applied to the prescaler IC (IC202) it is necessary to divide that output to have a frequency that enables the PLL IC (IC201) to function. The frequency dividing ratio of this model is limited to one twentieth (1/20). In addition, high-speed logic is possible since ECL (Emitter Coupled Logic) is used for IC202.

■ PLL IC (IC201) (See Figs. 9–3 and 10.)

• Function of each pin of IC201

Pin ① : Input pin of supply voltage (5 V)
Pin ② : Input pin of reference frequency (5.76 MHz) generator circuit
Pin ③ : Output pin of reference frequency (5.76 MHz) generator circuit
Pin ④ : Not used
Pin ⑤ : Divides reference frequency (5.76 MHz) by sixty-fourths (1/64) to make the reference frequency (90 kHz)
Pin ⑥ : Not used
Pin ⑦ : Muting signal output pin which, while frequencies are changed during the scanning, turns on transistor (Q201) and generates muting signal to cut off signal applied to IC2.
Pin ⑧ : Output pin of phase comparator
Pin ⑨ : Reference signal testing pin. Signal of 2.5 kHz is generated for FM reception, and that of 9 kHz for MW reception, and that of 1 kHz for LW reception.
Pin ⑩ : Program divider testing pin. Signal of 2.5 kHz is generated for FM reception, and that of 9 kHz for MW reception, and that of 1 kHz for LW reception.
Pin ⑪ and ⑫ :
Form a low-pass filter together with R205, R206 and C204. Pin ⑪ is input pin and pin ⑫ output pin of the low-pass filter. Amplifier between them is N-type open drain MOS. From pin ⑫ DC output which controls the electronic tuner is generated.
Pin ⑬ : Uses Vss as ground.
Pin ⑭ : Input pin of FM local oscillator. Since input response frequency of IC201 is 7.5 MHz at maximum, FM local oscillation is too much for the direct input. Therefore, 1/20 frequency division is carried out by the prescaler IC (IC202).
Pin ⑮ : Input pin of MW/LW local oscillator
Pin ⑯ : Input pin — clock signal (R3) — of microcomputer (IC301)
Pin ⑰ : Input pin — program data signal (R2) — of microcomputer (IC301)
Pin ⑱ : Input pin — latch signal (R4) — of microcomputer (IC301)

The above describes the function of each pin of IC201. Where PLL is locked (when fv becomes equal to fo, VDC becomes constant to lock the local oscillator frequency fo), the relation between the station frequency and the frequency dividing ratio (N) is shown as follows:

- **In FM reception:**
  Station frequency (F) = local oscillator frequency (fo) − IF (10.7 MHz)
  $f_o = 20 \times N \times f_r$ (f_r = 2.5 kHz = 0.0025MHz)
  $F = f_o - IF = 20 \times N \times f_r - 10.7$
  $= 20 \times N \times 0.0025 - 10.7$
  $= 0.05\ N - 10.7$
  Hence, $N = \frac{F + 10.7}{0.05}$ (N = frequency dividing ratio of program divider)

- **In MW reception (9 kHz interval area):**
  Station frequency (F) = local oscillator frequency (fo) − IF (450 kHz)
  $f_o = f_r \times N$ (f_r = 9 kHz)
  $F = f_r \times N - 450$
  $= 9N - 450$
  Hence, $N = \frac{F + 450}{9}$ (N = frequency dividing ratio of program divider)

- **In LW reception (1 kHz Interval area):**
  Station frequency (F) = local oscillator frequency (fo) − IF (450 kHz)
  $f_o = f_r \times N$ (f_r = 1 kHz))
  $F = f_r \times N - 450$
  $= N - 450$
  Hence, $N = F + 450$ (N = frequency dividing ratio of program divider)

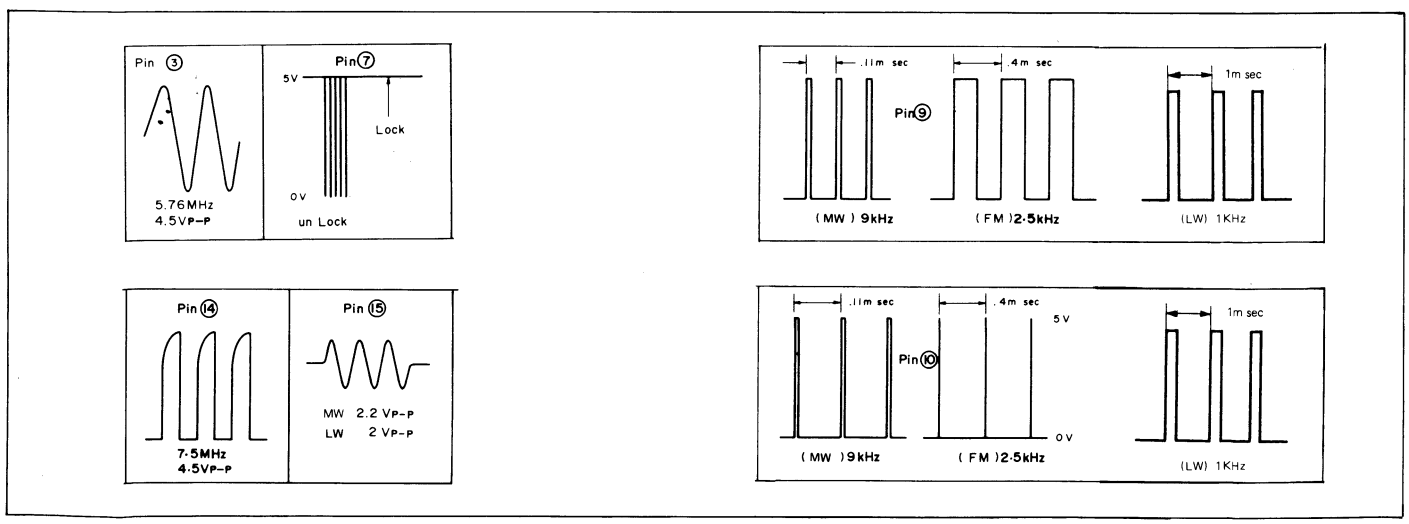


Figure 10

■ MICROCOMPUTER (IC301):

• Data input:

Data from the microcomputer are applied as 20-bit serial data with the clock pulse to the shift register and are latched (a kind of memorization) by the latch pulse (19 bits). Shifted one after another each time the clock pulse rises up, the data are fetched in from thier twentieth bit. When the data input is completed the latch pulse causes content of the shift register to be latched in the latch circuit.

• Functions of microcomputer:

This microcomputer has three functions mentioned below.

1. Digital quartz
2. Control of radio (PLL controller) section
   (a) Initial state
   (b) Auto scan (automatic/manual tuning)
   (c) Auto stop (5-second scanning stop)
   (d) Auto memory
   (e) Preset
   (f) Data output to PLL circuit
3. Display Circuit

Descriptions in respect to the microcomputer are mentioned below.

• Digital quartz:

IC301 has a built-in clock mechanism and it works as a highly precise digital clock with the oscillation frequency of the crystal (XL301) as a basis for clock function.

The relation with the time and oscillation frequency 32.768 kHz of the crystal (XL301) is as follows:

The accuracy of the clock is adjusted to be ±15 minutes of monthly difference, and the oscillation frequency affected by ambient temperature has, with the temperature of 25°C as a basis, a temperature characteristic as shown in Fig. 11–1. Therefore, the crystal (XL301) should be adjusted within the error in the plus (+) direction as much as possible. IC301 detects 1 minute by multiplying the oscillation frequency (32.768 kHz) of the crystal by 1/32768.

Suppose the oscillation frequency (32.768 kHz) deviates by Δf. Then, the error in a second "E" is as follows:

$$E = \frac{\Delta f}{32768}$$

Daily error ED:

$$ED = 24 \text{ (hours)} \times 60 \text{ (min.)} \times 60 \text{ (sec.)} \times E \text{ (error in a sec.)}$$
$$= 24 \times 60 \times 60 \times \frac{\Delta f}{32768}$$
$$= 2.636 \times \Delta f$$

To adjust the error within 0.5 second a day:

$0.5 = 2.636 \times \Delta f$

$\Delta f = 0.1896$ Hz

The daily error of 0.5 second is ±15-second error a month. In this set the error is adjusted to be "Δf = about 0.15Hz" so that the monthly error be within about plus 12 or minus 12 seconds.

• Control of Radio (PLL Controller) Section:

(a) Initial state

When the power switch is turned on, the set displays the least frequency specified for each of FM · MW · LW receptions. And as the preset memory tuning buttons (1 to 5) are pushed one after another, the frequency moves up in sequence according to Table 2.

(b) Auto Scan (automatic/manual tuning):

"Up" or "Down" pulse is caused by the scan oscillator circuit and each time it appears, the frequency moves up or down by 0.1 MHz for FM band and by 9 kHz for MW · LW band. And if the up/minute button or down/hour button is pushed continuously for more than 0.5 second, such frequency moving up or down operation is accelerated:

FM: ca. 129 msec./ch.
MW/LW: ca. 125 msec./ch.

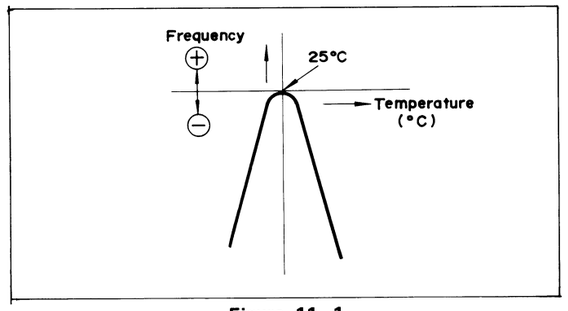


Figure 11–1

Initial value \ Station Memory Button	1	2	3	4	5
FM87.5 ~ 108MHz	87.50	88.00	98.00	106.00	108.00
MW531 ~ 1602kHz	531	603	999	1404	1602
LW155 ~ 281kHz	155	164	218	263	281

Table 2

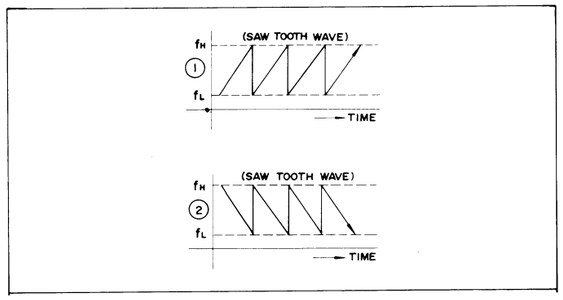


Figure 11–2

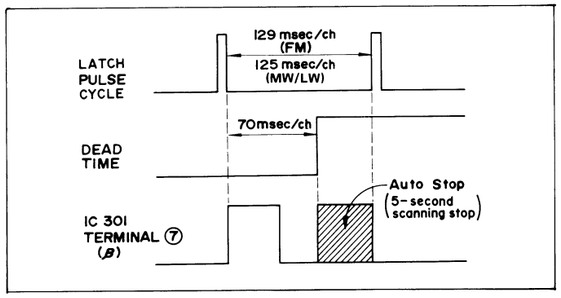


Figure 11–3

The scanning is performed by a sawtooth wave: when the up/minute button is pushed down, the frequency now indicated starts to scan to higher ones until the upper-limit frequency is attained. Then, the scanning starts again from the lower-limit frequency up to the upper-limit. (See Fig. 11–2–①.)

When the down/hour button is pressed, the frequency now indicated starts scanning to the lower ones till the lowest frequency is reached. Then, the scanning starts again from the highest frequency to the lowest. (See Fig. 11–2–②.)

During the automatic scanning, pin ㊼ of IC301 is at "Low" level, Q301 is off and Q4 is on so that the muting circuit is put in action. Q105 works only during the scanning

(c) Auto stop (5-second scanning stop) (See Fig. 11–3)

When pin ⑦ of IC301 becomes "Low" level during the automatic scanning, the scanning stops for 5 seconds for both FM · MW and LW bands.

The below is the dead time from the time the microcomputer (IC301) feeds the frequency data N (N = frequency dividing ratio of program divider) to IC201 till the time it detects the auto stop signal (dead time).

FM: ca. 70 msec./ch.
MW · LW: ca. 70 msec./ch.

Latch pulse cycle:

FM: 129 msec./ch.
MW · LW: 125 msec./ch.

After the 5-second stop of scanning, the scanning starts again in the same direction as done before the stop. If the up/minute button or the down/hour button is pushed down within 5 seconds, a detuning occurs.

(d) Automatic memory

When the automatic memory button is pressed down, the data previously stored are cancelled and the scanning starts from the lower-limit frequency to the upper-limit. During the scanning, frequencies of signals detected from the automatic stop circuit are automatically preset to the preset memory tuning buttons 1 to 5 in order, and at the same time, the numbers are indicated in order by the multi display.

The mark ▲ flickers at intervals of 0.5 second (on for 0.25 sec. and off for 0.25 sec.). When all 5 stations are stored during scanning, completion of presetting the 5th station stops the scanning, and a frequency of the 5th station is indicated. If only 3 stations have been stored even after the scanning reaches its upper-limit frequency and it stops, the automatic memory gets out of action and frequency of the 3rd station is indicated. In this case, if the tuning button 4 or 5 is pushed, the lower-limit frequency is indicated.

To stop the automatic memory operation during the scanning, press the up/minute button, down/hour button, or time adjustment/APMS/station scanning stop button. When the time adjusting/time setting button is pressed during the automatic memory operation, the automatic memory operation stops to have the set in a state where the time setting is possible.

When the MW/FM switch is switched over or the power switch is turned off, the frequency of the previous state (the last frequency memory) is indicated.

(e) Preset

A total of 10 stations (5 stations each for FM · MW and LW bands) can be memorized by presetting. A preset frequency is applied to RAM (Random access memory) of IC301 and the preset memory tuning number is displayed together with the frequency. When the +B power of IC301 is turned off, the contents in RAM are all cleared to be of the initial value of each band.

(f) Data output to PLL IC (IC201)

To the PLL IC (IC201) are applied data from pins ㊽, ㊾ and ㊿ of the IC301 through the inverter consisting of Q302, Q303 and Q304.

• Display Circuit

Output signals from pins H_1, H_2 and O_{11} thru O_{46} of the IC301 are to drive the liquid crystal of the display circuit. The connection diagram of each display segment with each pin of IC301 is shown by Fig. 12 below.

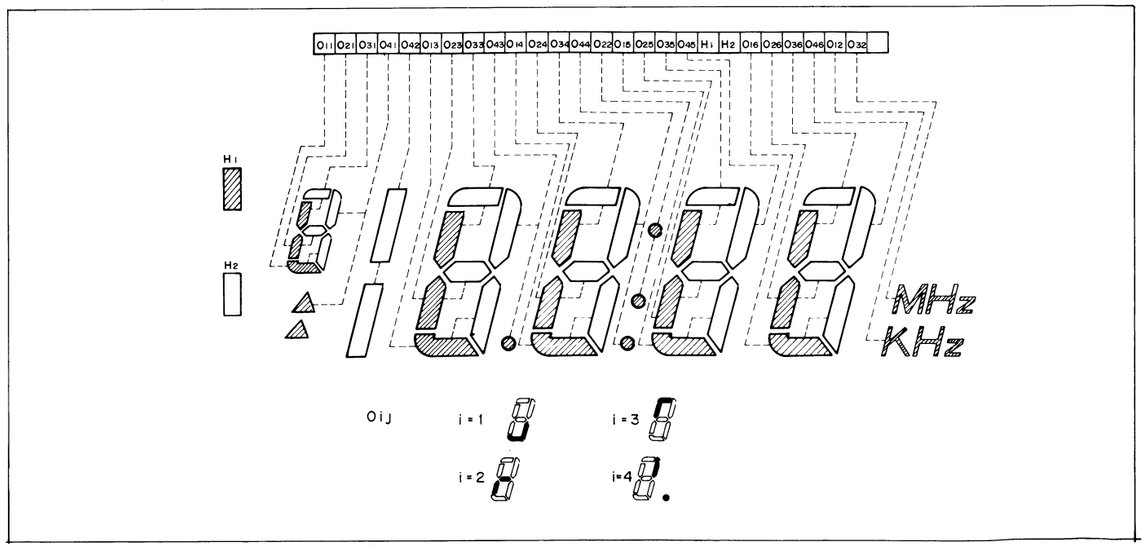


Figure 12

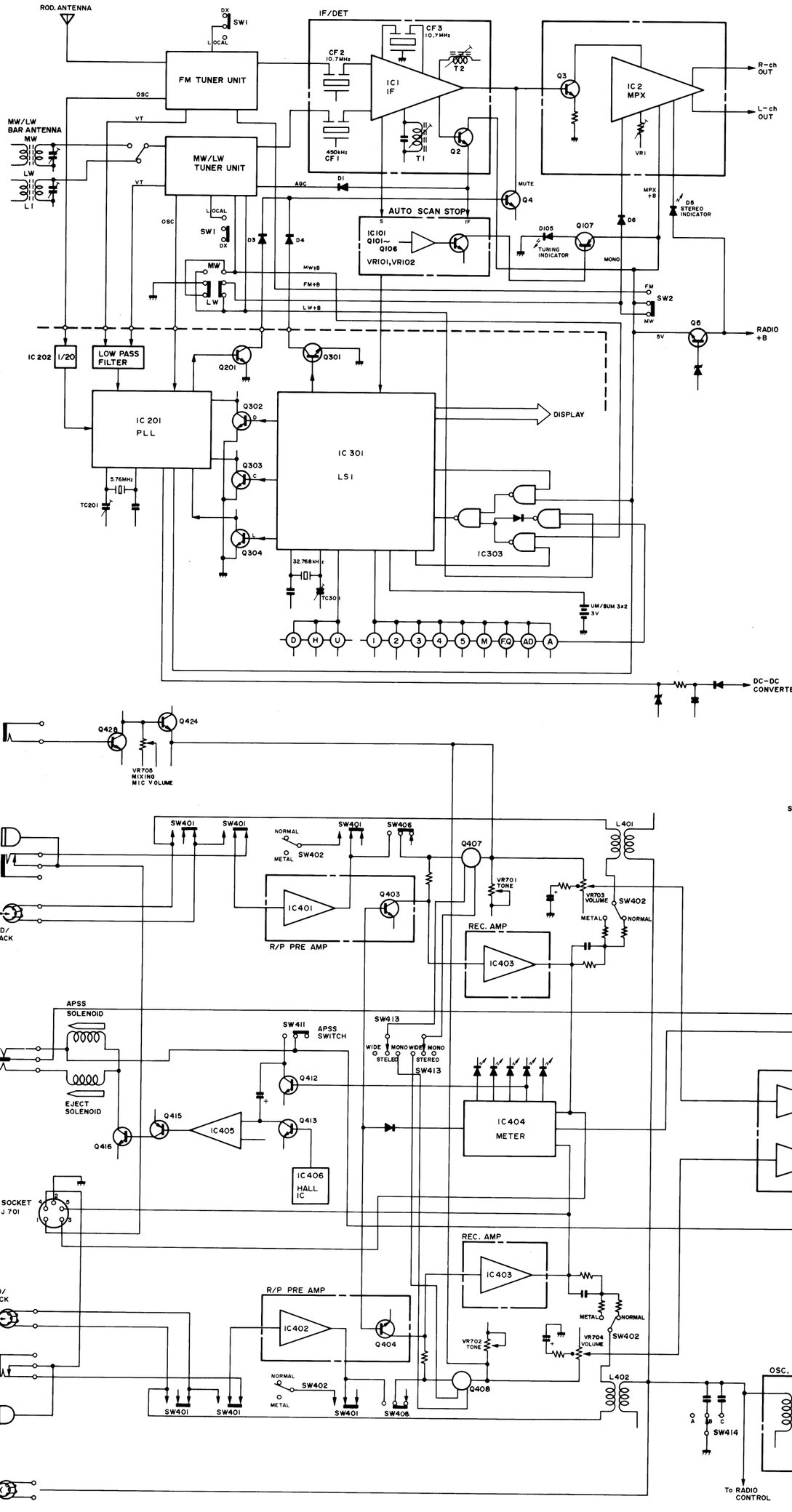


Figure 13 BLOCK DIAGRAM

MECHANISM ADJUSTMENT

■ FLYWHEEL THRUST CLEARANCE ADJUSTMENT

1. Slowly rotate the flywheel thrust clearance adjusting screw clockwise using a screwdriver till no thrust clearance is found.
2. Counterclockwise turn the thrust clearance adjusting screw by about 1/5 to 3/5 turn. (Since the adjusting screw has a pitch of 0.5 mm, the thrust clearance becomes 0.1 to 0.3 mm thereby.)

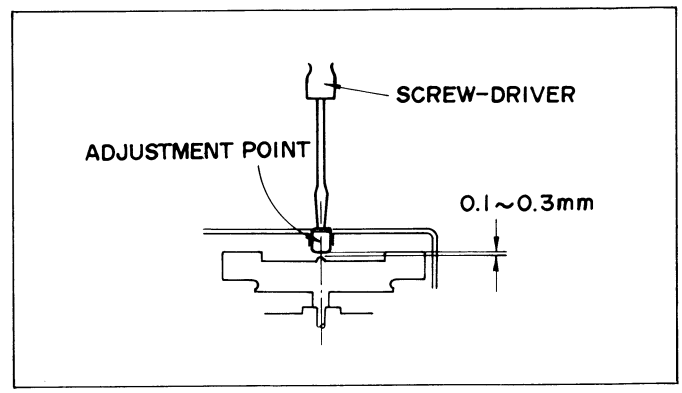


Figure 15–1

■ PAUSE TIMING ADJUSTMENT

1. Gently press the pause key to check the pause lock pin securely locks the pause lock plate.
2. Gently press the pause key again to release locking, and make sure the clearance between the pause lock pin and pause lock plate is over 0.3 mm.
3. Put the set in the play mode and gently press the pause key to stop the take-up turntable, then check the clearance between the capstan shaft and pressure roller is within the range from 0.1 to 0.3 mm.
4. If Items 2 and 3 are not satisfied, bend the part Ⓐ for adjustment.

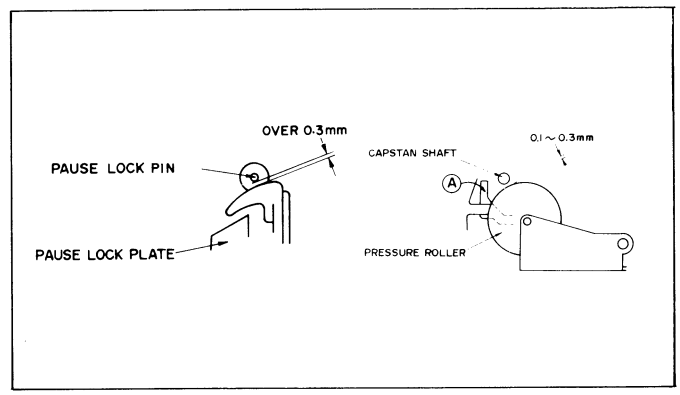


Figure 15–2

■ PRESSURE ROLLER PRESSURE ADJUSTMENT

1. Put the set in the play mode.
2. Press a tension gauge against the point Ⓐ to separate the pressure roller from the capstan shaft.
3. Slowly loozen the tension gauge in the arrow direction, and check the reading is within the range from 300 to 380 gr when the pressure roller has just touched the capstan shaft.
4. If Item 3 above is not satisfied, bend the part Ⓑ for adjustment. (If the pressure roller pressure is over 380 g, bend the part Ⓑ in the direction ①, and if below 300 gr., in the direction ② .)

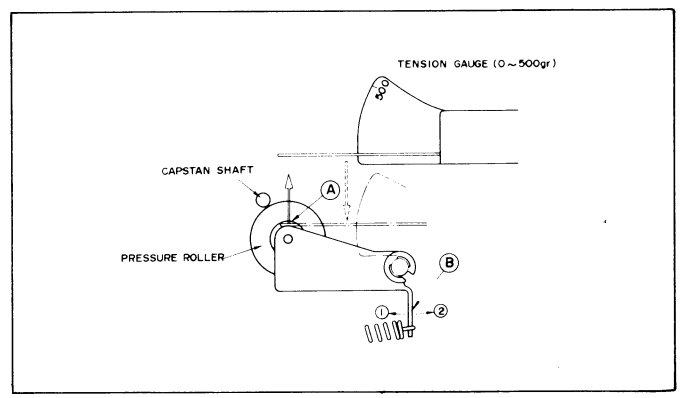


Figure 15–3

■ TORQUE CHECK

1. Mount a torque measuring reel on the turntable (on the take-up turntable when in the play or fast forward mode, and on the supply turntable in the rewind mode.)
2. Gradually release the tension gauge, and read it when the turntable turns at a constant speed.

Mode	Torque measured
Play	35 ~ 60 gr. cm
FF	70 ~ 120 gr. cm
Rewind	70 ~ 120 gr. cm

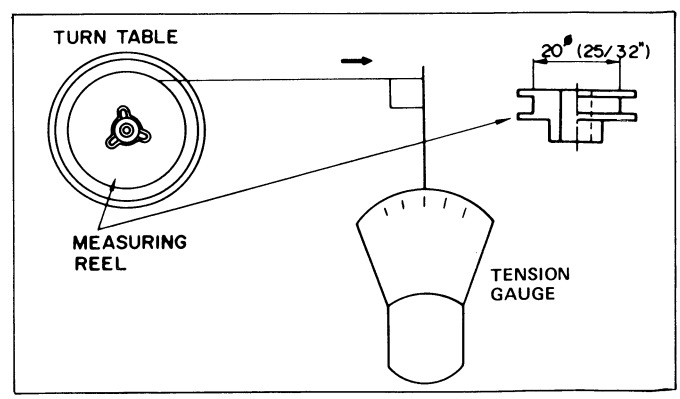


Figure 15–4

■ APSS SOLENOID ADJUSTMENT

1. Put the set in play mode.
2. Press down the solenoid iron core while pushing the fast forward or rewind keys, then make sure the clearance between the lock lever and the fast forward or rewind lever is within 0 to 0.2 mm.
3. If Item 2 is not satisfied, loosen the two screws at the solenoid to change its position for further adjustment.

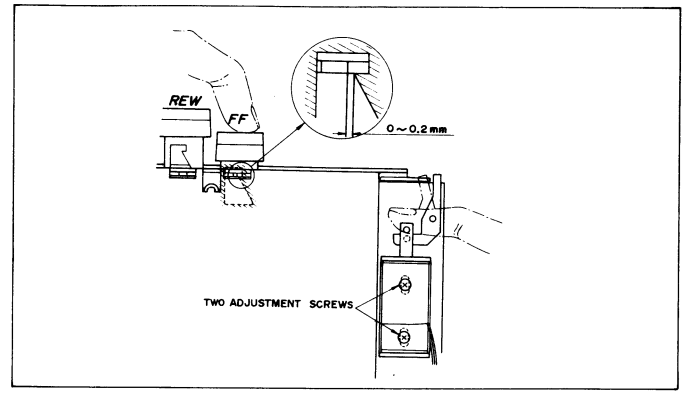


Figure 16–1

■ HEAD STROKE ADJUSTMENT

1. Insert a head stroke gauge, whose zero point has been adjusted, into the set, and put the set in play mode.
2. Check that the record/playback head and/or erase head stroke is as specified as shown in Fig. 16–2.
3. Putting the set in fast forward APSS and/or rewind APSS mode, check that the record/playback head and/or erase head is as specified as shown in Fig. 16–2.
4. If Item 3 is not satisfied, bend the part Ⓐ shown in Fig. 16–2 for further adjustment.

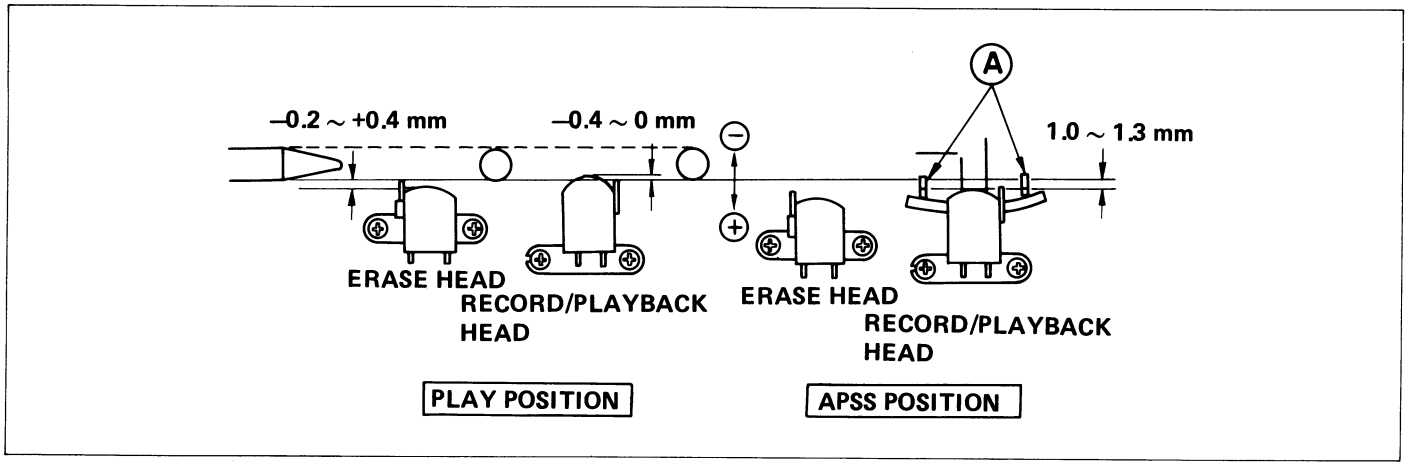


Figure 16–2

■ TAPE SPEED ADJUSTMENT

1. Connect a frequency counter, across a resistor of 4 to 8 ohms, to the external speaker socket (SO401 or SO402).
2. Playback a test tape (MTT-111, 3 kHz recorded): play it at the midpoint but not at the running start or end point.
3. Use a bladed screwdriver to adjust, through the adjusting hole at the bottom of motor, the semi-variable resistor so that the reproduced frequency becomes 2965 to 3030 kHz.

Note:
Before the adjustment, check that there is no stain nor other impurities on the motor pulley, flywheel belt, flywheel, take-up pulley, take-up idler and take-up turntable.

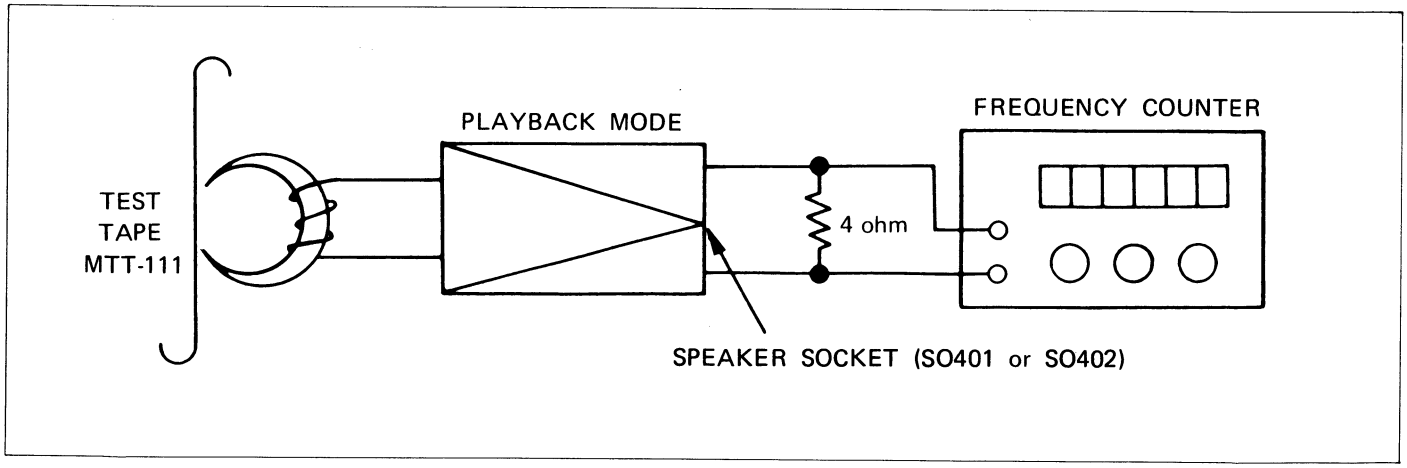


Figure 16–3

ALIGNMENT PROCEDURE (Refer to Fig. 18)

■ FM IF/RF ALIGNMENT

- Set the FM switch (SW4) at "ON" position.
- Set the radio sensitivity switch (SW1) at "DX" position.

Step	Test Stage	Signal Generator		Frequency Display	Adjustment	Remarks
		Connection	Frequency			
1	IF	See Fig. 17–1. Reduce the input as small as possible, and raise oscilloscope's gain as high as possible.	10.7MHz (400Hz, 100%, FM modulated)	With the station memory button "5": 108MHz	FM IFT and T2	Adjust FM IFT to obtain the maximum waveform, and T2 to make the waveform symmetrical, with 10.7MHz as its center.
2	RF	See Fig. 17–2.		87.5MHz	Oscillator coil	Adjust the osc. coil to have DC VTVM read 1.7 ~ 1.8V.
3		See Fig. 17–2. Reduce the input as small as possible.	88MHz (400Hz, 100%, FM modulated)	88MHz	FM antenna coil RF coil	Adjust the coils to have AC VTVM reading the maximum.
4		Same as step 3.	108MHz (400Hz, 100%, FM modulated)	108MHz	Oscillator trimmer	Same as step 3.
5		Repeat steps 2, 3 and 4 until with the signal input of 88MHz to 108MHz the ③ Pin voltage will range from 1.7V to 7.8V (DC).				

Note:
For this adjustment, also refer to Fig. 53–1 shown later, which illustrates the FM tuner unit and in which you will find all the controls used in this adjustment except for the T2.

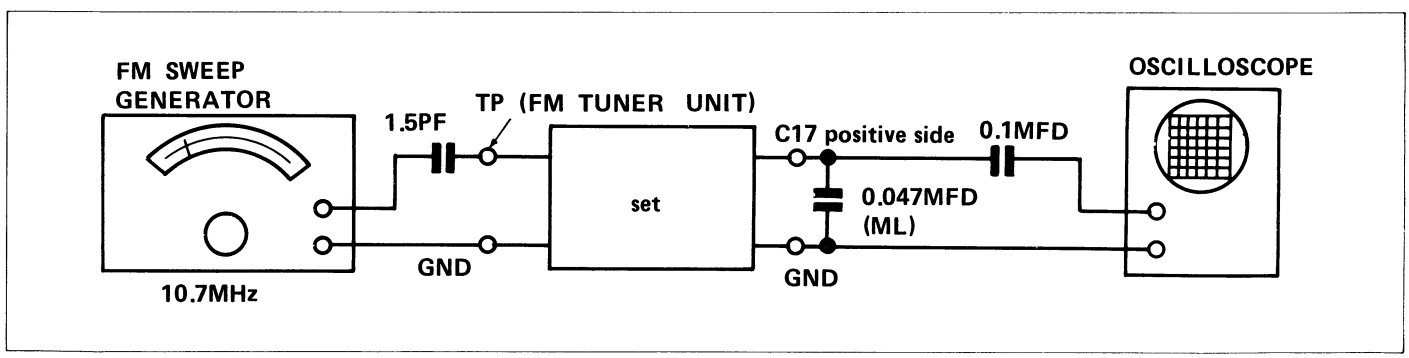


Figure 17–1

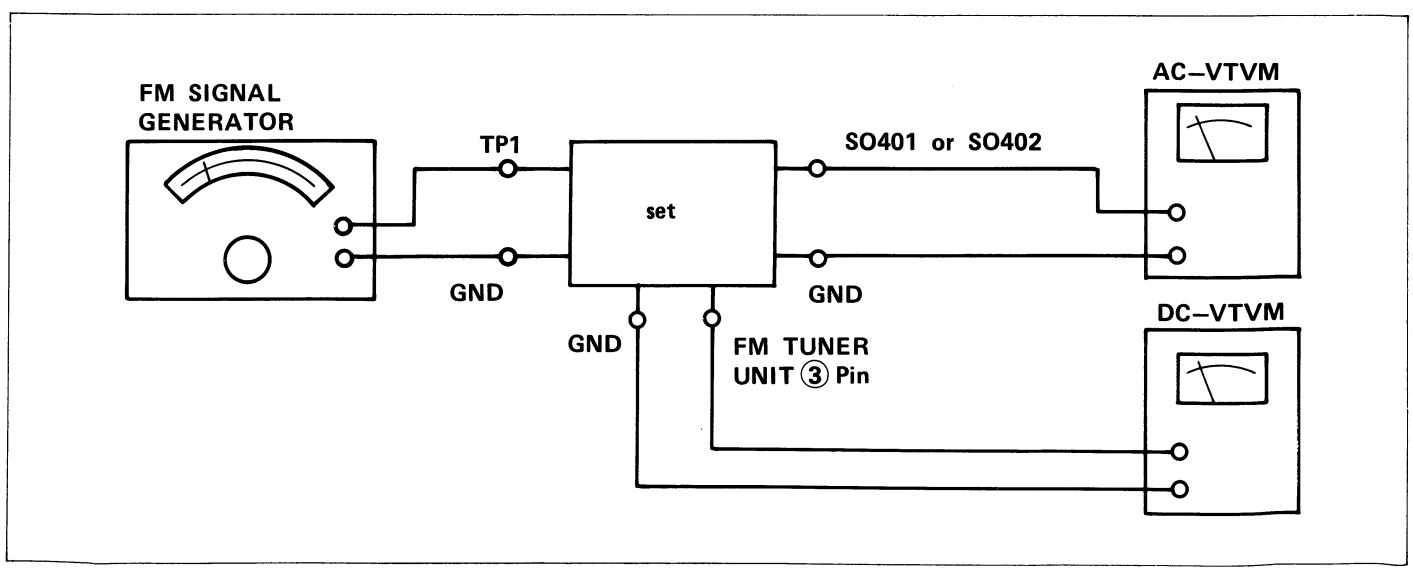


Figure 17–2

■ AM (MW/LW) IF/RF ALIGNMENT

• Set the local/DX switch at "DX" position.

Step	Test Stage	Signal Generator		Frequency Display	Adjustment	Remarks
		Connection	Frequency			
1	IF (MW)	See Fig. 18–1. Reduce the input as small as possible, and raise oscilloscope's gain as high as possible.	450kHz (400Hz,30%, AM modulated)	With the tuning button "5" 1602kHz	AM IFT (violet)	Adjust the AM IFT so that IF curve becomes symmetrical and steady in its waveform. Repeat it two to three times.
2	RF (MW)			531kHz	Oscillator coil (White)	Adjust the coil to have DC VTVM read 1.2 ~ 1.25V.
3		See Fig. 19–1. Reduce the input as small as possible.	603kHz (400Hz,30%, AM modulated)	603kHz	RF coil (Blue)	Adjust the coil to have AC VTVM read its maximum.
4		Same as step 3.	1404kHz (400Hz,30%, AM modulated)	1404kHz	Oscillator trimmer	Same as step 3.
5		Repeat steps 2 to 4 until, with the input signal of 531kHz to 1602kHz, the output voltage will read within 1.2V to 8.3V.				
6		Same as step 3.	603kHz (400Hz,30%, AM modulated)	603kHz	MW/LW antenna coil (L1)	Same as step 3.
7		Same as step 3.	1404kHz (400Hz,30%, AM modulated)	1404kHz	MW antenna trimmer (TC1)	Same as step 3.
8		Repeat steps 6 and 7 until no further improvement is attained.				
9	RF (LW)			155kHz	Oscillator coil	Adjust the coil to have DC VTVM read 1.6 ~ 1.65V.
10		See Fig. 19–1. Reduce the input as small as possible.	164kHz (400Hz,30%, AM modulated)	164kHz	RF coil (Yellow) MW/LW antenna coil (L1)	Adjust the coil to have AC VTVM read its maximum.
11		Same as step 3.	263kHz (400Hz,30%, AM modulated)	263kHz	LW antenna trimmer (TC2)	Same as step 3.
12		Repeat steps 9 to 11 until, with the input signal of 155kHz to 263kHz, the output voltage will read within 1.6V to 7.5V.				

Note:

For this adjustment, also refer to Fig. 53–2 later shown later, which illustrates the MW/LW tuner unit and in which you will find all the controls used in Steps 1 to 11 of this adjustment.

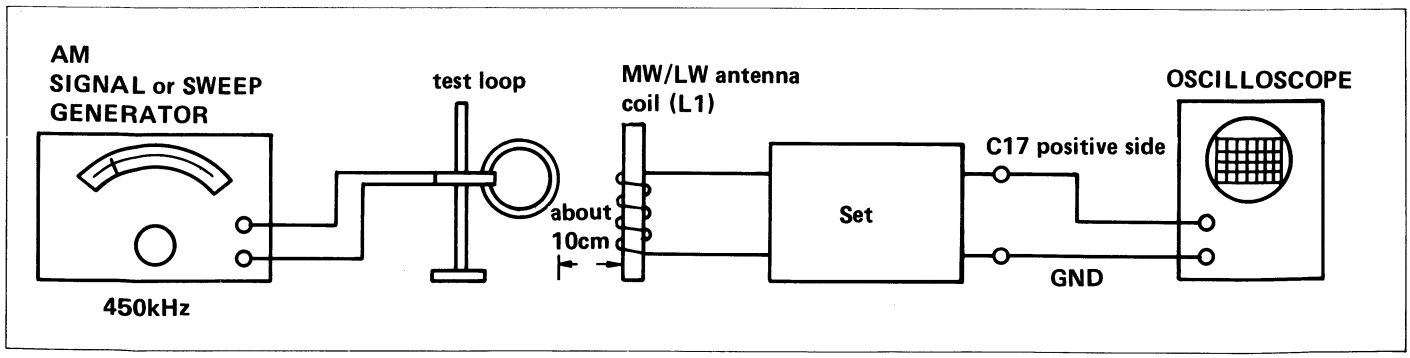


Figure 18–1

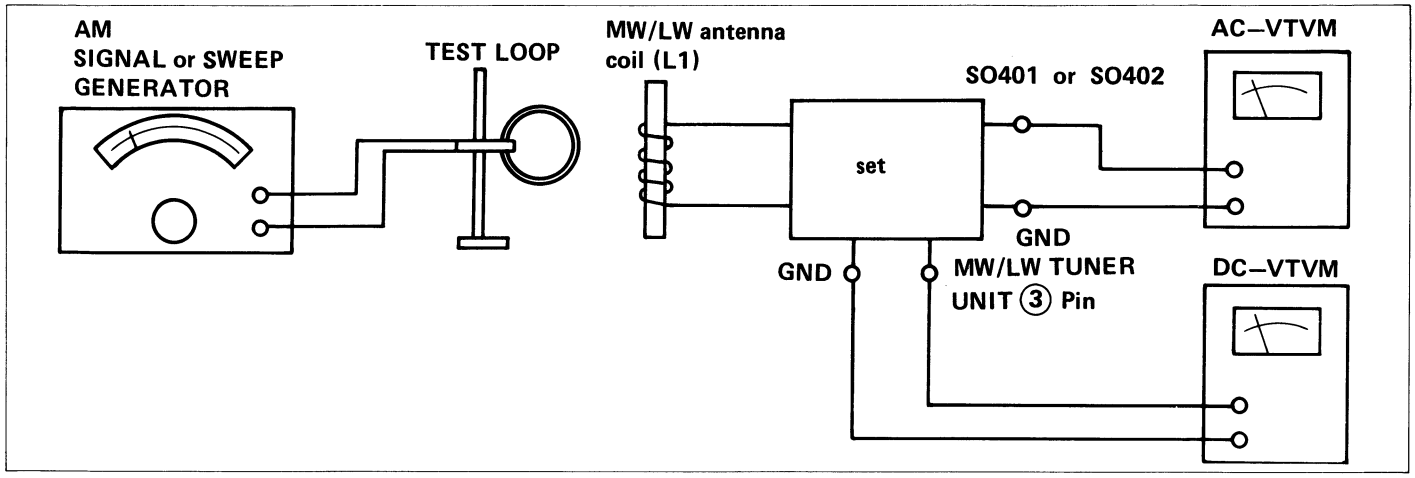


Figure 19–1

■ FM SCAN STOP ADJUSTMENT

- Set the FM switch (SW–4) at "ON" position.
- Set the radio sensitivity switch (SW1) at "DX" position.

Step	Test Stage	Signal Generator		Frequiency Display	Adjustment	Remarks
		Connection	Frequency			
1	Reference Frequency	See Fig 19–2 Connet FM signal generator to the TP of FM tuner unit.	88MHz	88MHz	T2	Connect V.T.V.M. between the TP3 (+) and TP4 (–). Adjust for 250 ± 30mV.
2	Same as above	Same as above	88MHz-25kHz (400Hz, 10kHz, FM modulated)	Same as above	VR102	Connect oscilloscope to the TP5. Adjust the waveform becomes Figure 19–3.
3	Same as above	Same as above	88MHz+25kHz (400Hz, 10kHz, FM modulated)	Same as above	VR101	Same as above

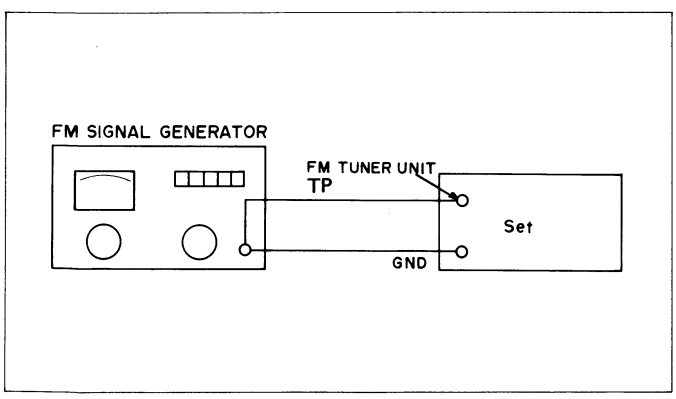
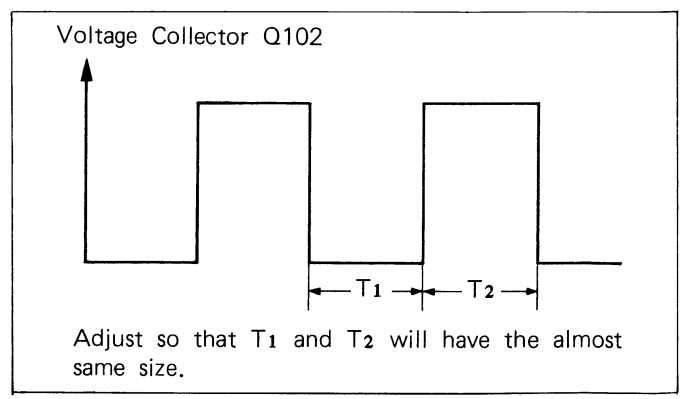


Figure 19–2



Adjust so that T1 and T2 will have the almost same size.

Figure 19–3

■ MW/LW SCAN STOP ADJUSTMENT

1. Set the band selector switch (SW2 or SW3) at "MW or LW" position.
2. Disconnect the connector (CNS101) from CNP101.
3. Apply +5V, across a resistor of 5K ohms, to the test point TP101.
4. Apply signal of 450 kHz, from AM signal generator, to the set, and adjust the signal level so that the tuning LED (D105) begins to light.
5. Adjust the semi-variable resistor (VR103) so that voltage at the collector of transistor (Q106) becomes below 0.5 V.

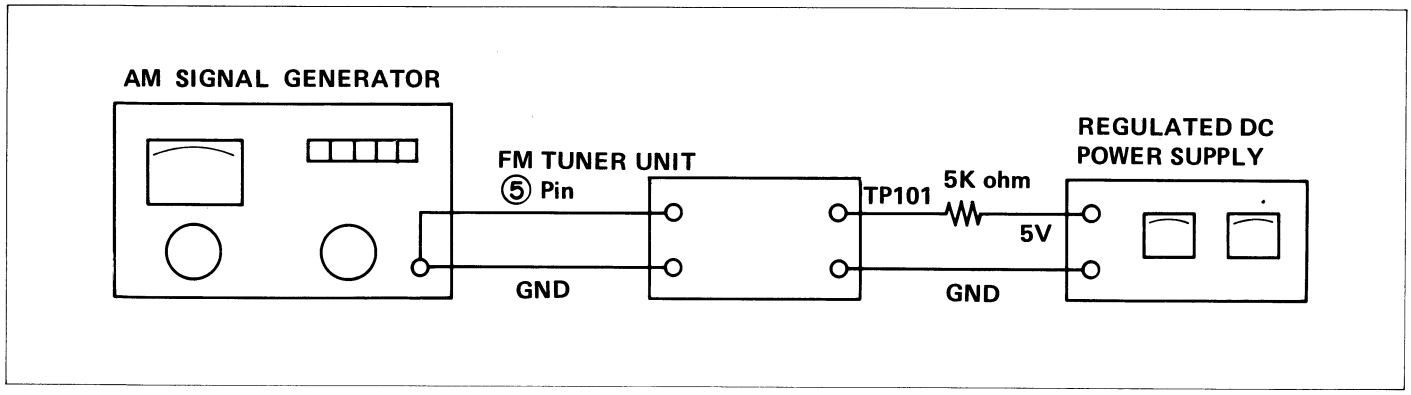


Figure 20–1

■ PLL REFERENCE FREQUENCY CHECK

1. Set the band selector switch at "FM" position.
2. Adjust the station memory button "5" to indicate 108MHz
3. Connect a frequency counter, across a capacitor of 10 pF, to pin ⑦ of FM tuner unit, and ground one end of the counter.
4. Make sure the frequency counter reads 118.7MHz (108MHz + 10.7MHz) ± 500Hz. Adjust the trimmer (TC201).

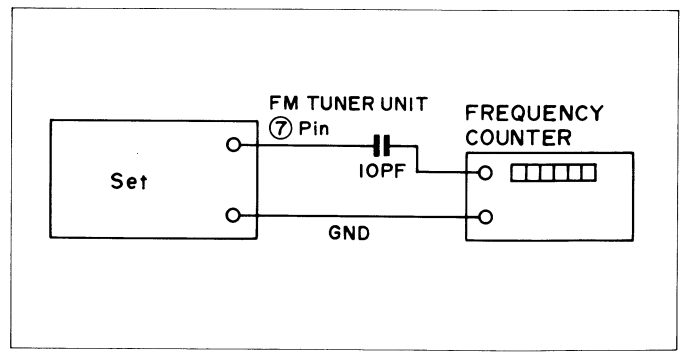


Figure 20–2

■ CLOCK REFERENCE FREQUENCY ADJUSTMENT

1. Connect a frequency counter, across a capacitor of 2 pF to 5 pF, to pin ⑬ of IC301, and ground one end of the counter.
2. Adjust the trimmer (TC301) so that the frequency counter reads 32.768 kHz ± 0.15 Hz: it had better go within + error (+ 0.15 Hz) than within ⊖ error (– 0.15 Hz).

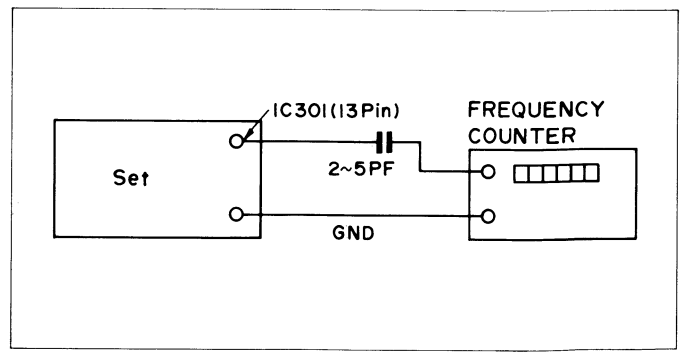


Figure 20–3

■ HEAD AZIMUTH ADJUSTMENT

Get a test tape (MTT-114, 10 kHz, 250 pWb/mm, –10 dB recorded).

1. Put the set in play mode.
2. Adjust the azimuth adjusting screw so that 10 kHz signal will be the loudest at both right and left channels.
3. After that, apply screw-lock to the screw to be secured.

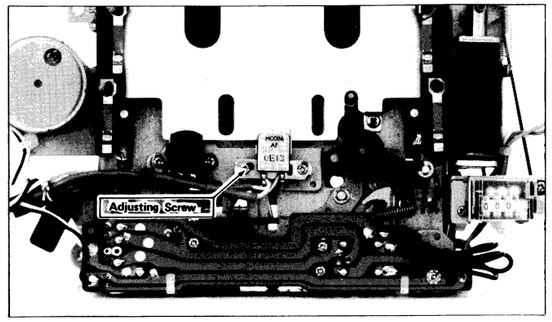


Figure 21–1

■ FM MULTIPLEX (19 kHz) ADJUSTMENT

1. Set the band selector swithc (SW4) at "FM" position.
2. Set the radio sensitivity switch (SW1) at "local" position.
3. Adjust the station memory button "1" to indicate 87.5 MHz.
4. Apply signal of 87.5 MHz (54 dB, non-modulated), from FM signal generator, to the set, and adjust the semi-variable resistor (VR1) so that the frequency counter reads 19.00 ± 0.02 kHz.

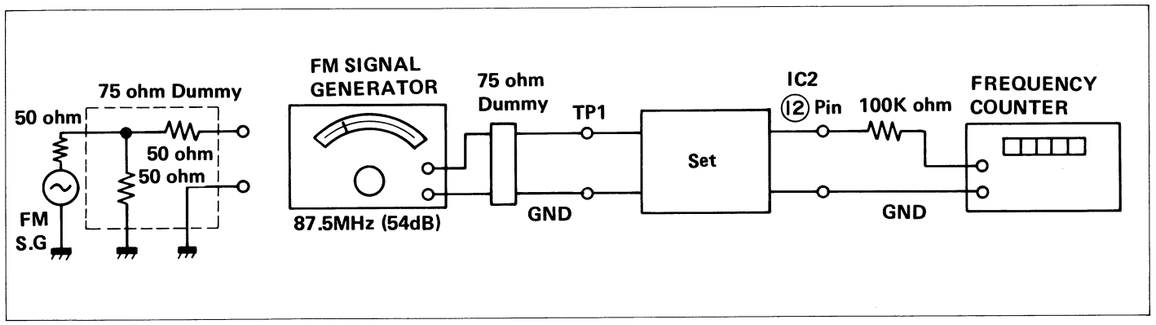


Figure 21–2

■ BIAS CURRENT ADJUSTMENT

1. Connect VTVM to the resistors (R401 and R402) of the set.
2. Set the tape selector switch (SW402) at "metal" position.
3. Put the set in record mode, and adjust L401 and L402 so that VTVM reads within 80 to 100 mV.

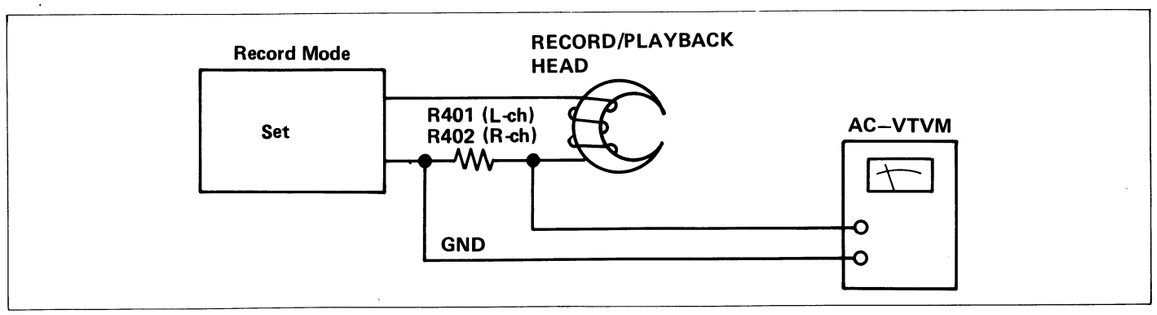
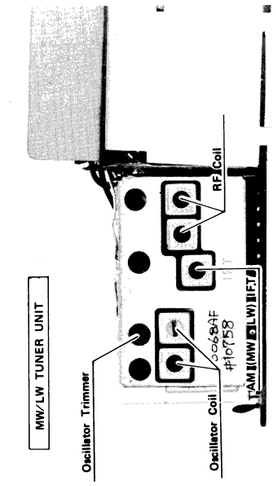
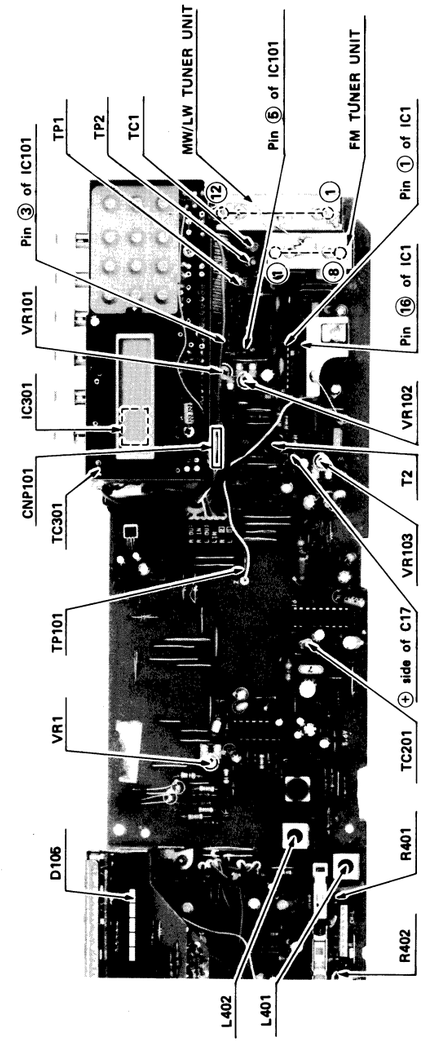


Figure 21–3

ALIGNMENT POINTS





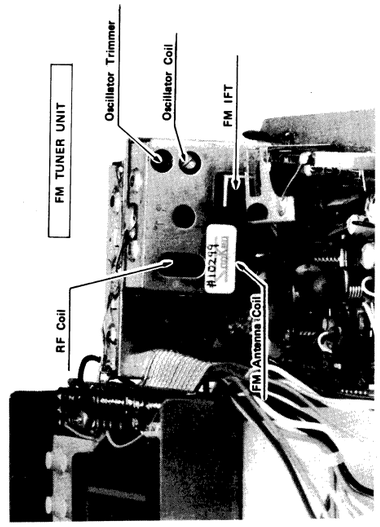
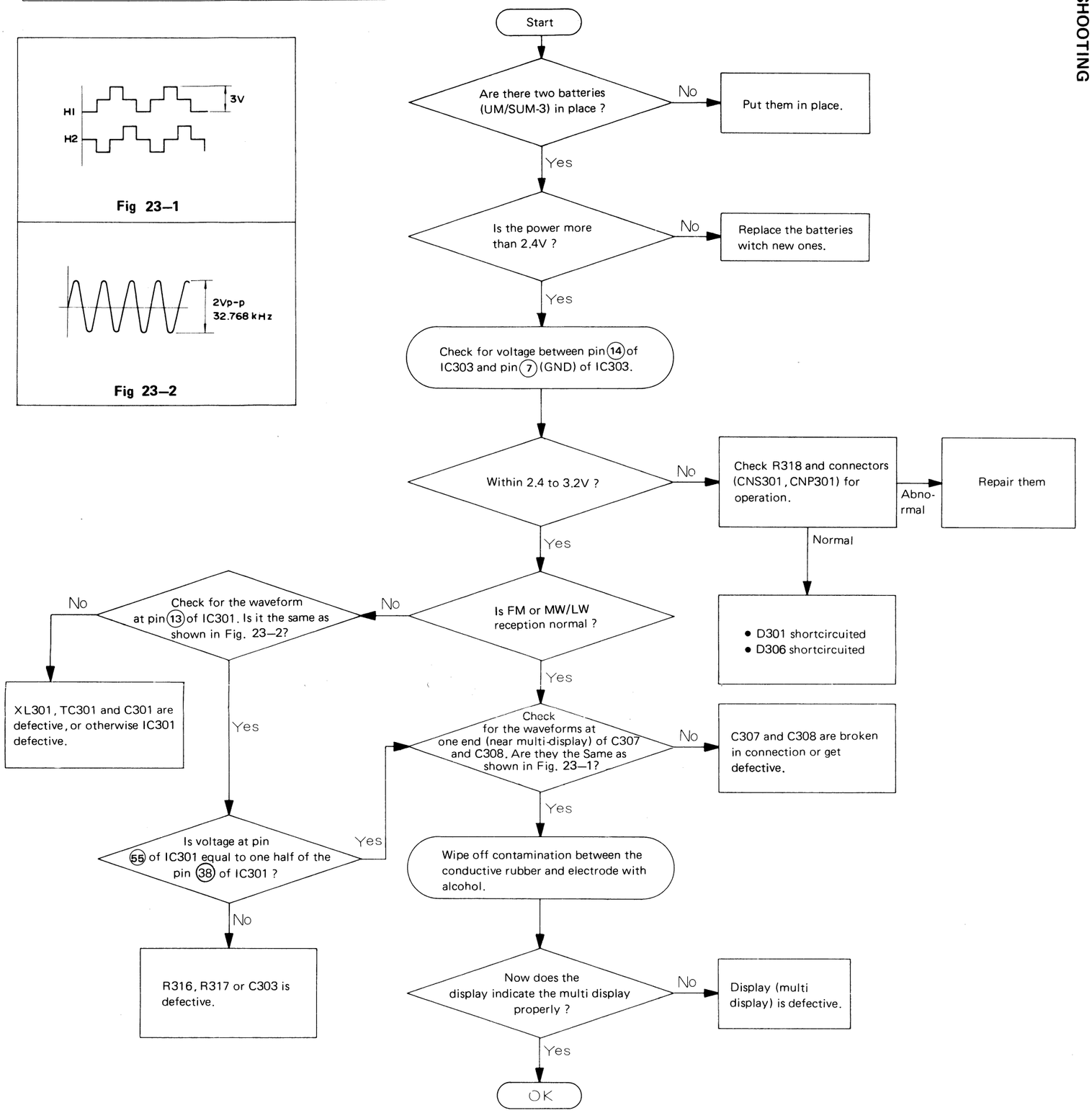


Figure 22

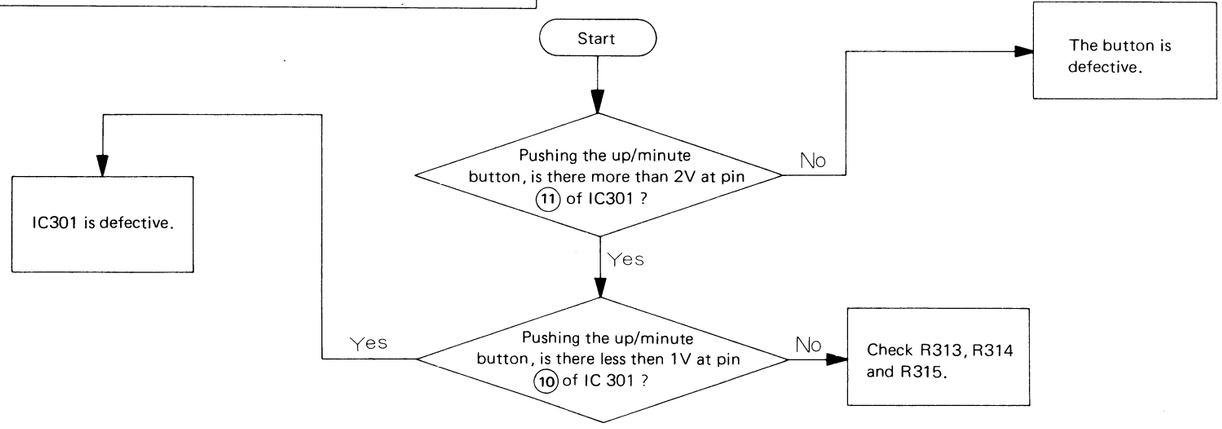
1. Multi display erratically or no display at all

Fig 23–1

Fig 23–2

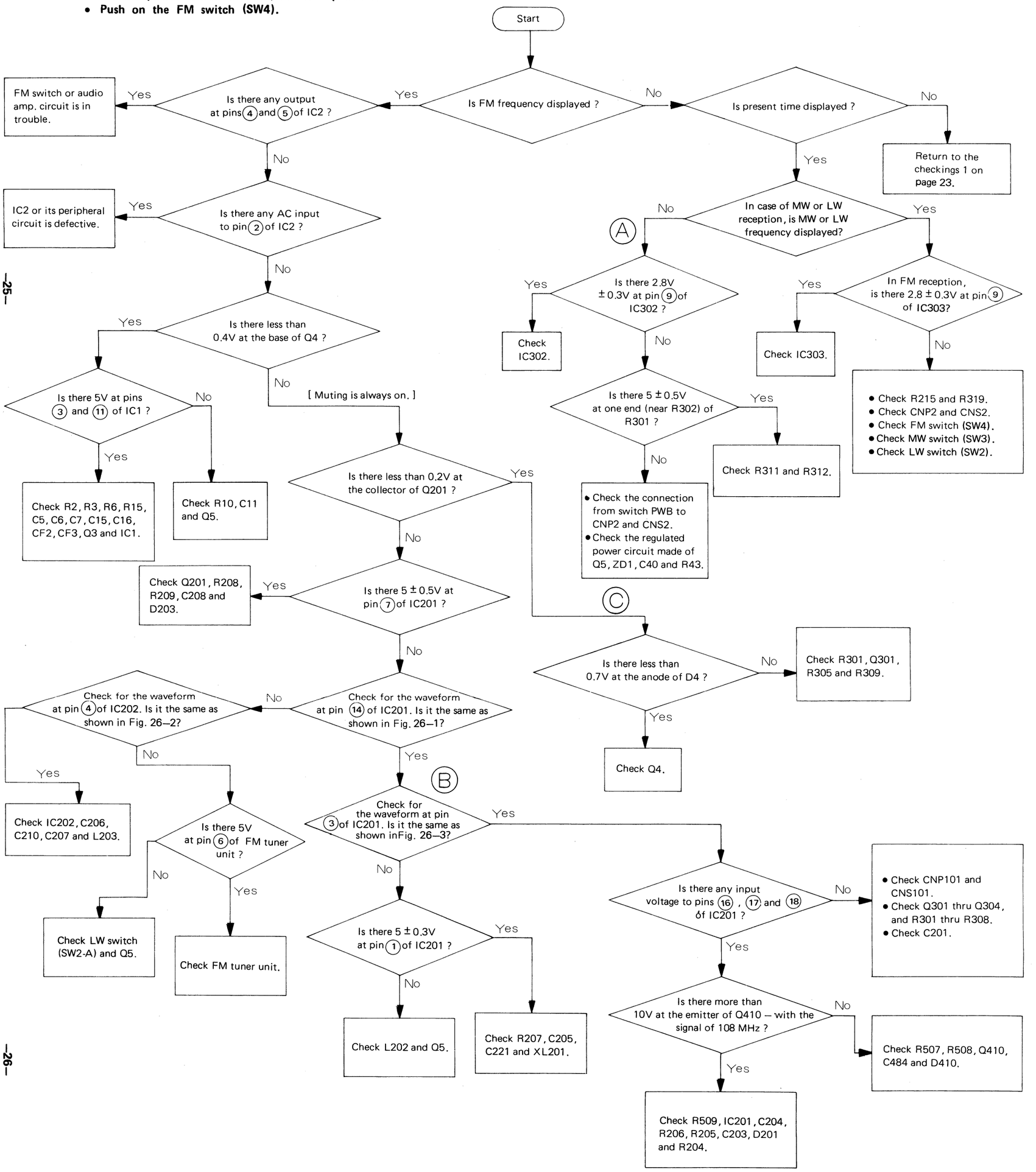

Start
Are there two batteries (UM/SUM-3) in place ?
No
Put them in place.
Yes
Is the power more than 2.4V ?
No
Replace the batteries witch new ones.
Yes
Check for voltage between pin (14) of IC303 and pin (7) (GND) of IC303.
Within 2.4 to 3.2V ?
No
Check R318 and connectors (CNS301, CNP301) for operation.
Abno-rmal
Repair them
Normal
Yes
Is FM or MW/LW reception normal ?
No
Check for the waveform at pin (13) of IC301. Is it the same as shown in Fig. 23–2?
No
• D301 shortcircuited
• D306 shortcircuited
XL301, TC301 and C301 are defective, or otherwise IC301 defective.
Yes
Yes
Check for the waveforms at one end (near multi-display) of C307 and C308. Are they the Same as shown in Fig. 23–1?
No
C307 and C308 are broken in connection or get defective.
Yes
Is voltage at pin (55) of IC301 equal to one half of the pin (38) of IC301 ?
Yes
Wipe off contamination between the conductive rubber and electrode with alcohol.
No
R316, R317 or C303 is defective.
Now does the display indicate the multi display properly ?
No
Display (multi display) is defective.
Yes
OK

2. Despite of a proper display, there is no proper operation with the up/minute or down/hour button.


Start
Pushing the up/minute button, is there more than 2V at pin (11) of IC301 ?
No
The button is defective.
Yes
IC301 is defective.
Yes
Pushing the up/minute button, is there less then 1V at pin (10) of IC 301 ?
No
Check R313, R314 and R315.

3. FM reception is improper or it doesn't work at all.

- **Set the power switch (SW406) at "on" position.**
- **Push on the FM switch (SW4).**


Start
Is FM frequency displayed ?
Yes
Is present time displayed ?
No
Return to the checkings 1 on page 23.
Is there any output at pins (4) and (5) of IC2 ?
Yes
FM switch or audio amp. circuit is in trouble.
No
Is there any AC input to pin (2) of IC2 ?
Yes
IC2 or its peripheral circuit is defective.
No
Is there less than 0.4V at the base of Q4 ?
Yes
Is there 5V at pins (3) and (11) of IC1 ?
Yes
Check R2, R3, R6, R15, C5, C6, C7, C15, C16, CF2, CF3, Q3 and IC1.
No
Check R10, C11 and Q5.
No
[Muting is always on.]
Is there less than 0.2V at the collector of Q201 ?
Yes
• Check the connection from switch PWB to CNP2 and CNS2.
• Check the regulated power circuit made of Q5, ZD1, C40 and R43.
No
Is there 5 ± 0.5V at pin (7) of IC201 ?
Yes
Check Q201, R208, R209, C208 and D203.
No
Check for the waveform at pin (14) of IC201. Is it the same as shown in Fig. 26–1?
No
Check for the waveform at pin (4) of IC202. Is it the same as shown in Fig. 26–2?
Yes
Check IC202, C206, C210, C207 and L203.
No
Is there 5V at pin (6) of FM tuner unit ?
No
Check LW switch (SW2-A) and Q5.
Yes
Check FM tuner unit.
Yes
Check for the waveform at pin (3) of IC201. Is it the same as shown inFig. 26–3?
Yes
No
Is there 5 ± 0.3V at pin (1) of IC201 ?
Yes
Check R207, C205, C221 and XL201.
No
Check L202 and Q5.
A
In case of MW or LW reception, is MW or LW frequency displayed?
No
Yes
Is there 2.8V ± 0.3V at pin (9) of IC302 ?
Yes
Check IC302.
No
Is there 5 ± 0.5V at one end (near R302) of R301 ?
Yes
Check R311 and R312.
No
• Check the connection from switch PWB to CNP2 and CNS2.
• Check the regulated power circuit made of Q5, ZD1, C40 and R43.
In FM reception, is there 2.8 ± 0.3V at pin (9) of IC303?
Yes
Check IC303.
No
• Check R215 and R319.
• Check CNP2 and CNS2.
• Check FM switch (SW4).
• Check MW switch (SW3).
• Check LW switch (SW2).
C
Is there less than 0.7V at the anode of D4 ?
No
Check R301, Q301, R305 and R309.
Yes
Check Q4.
B
Is there any input voltage to pins (16), (17) and (18) of IC201 ?
No
• Check CNP101 and CNS101.
• Check Q301 thru Q304, and R301 thru R308.
• Check C201.
Yes
Is there more than 10V at the emitter of Q410 – with the signal of 108 MHz ?
No
Check R507, R508, Q410, C484 and D410.
Yes
Check R509, IC201, C204, R206, R205, C203, D201 and R204.

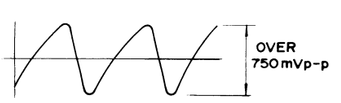
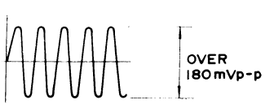


Fig 26–1



f = Frequency display + 10.7 MHz

Fig 26–2

Fig 26–3

4. AM reception is improper or it doesn't work at all

- **Set the power switch (SW406) "on" position.**
- **Push on the MW switch (SW3).**

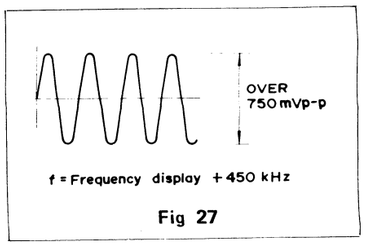
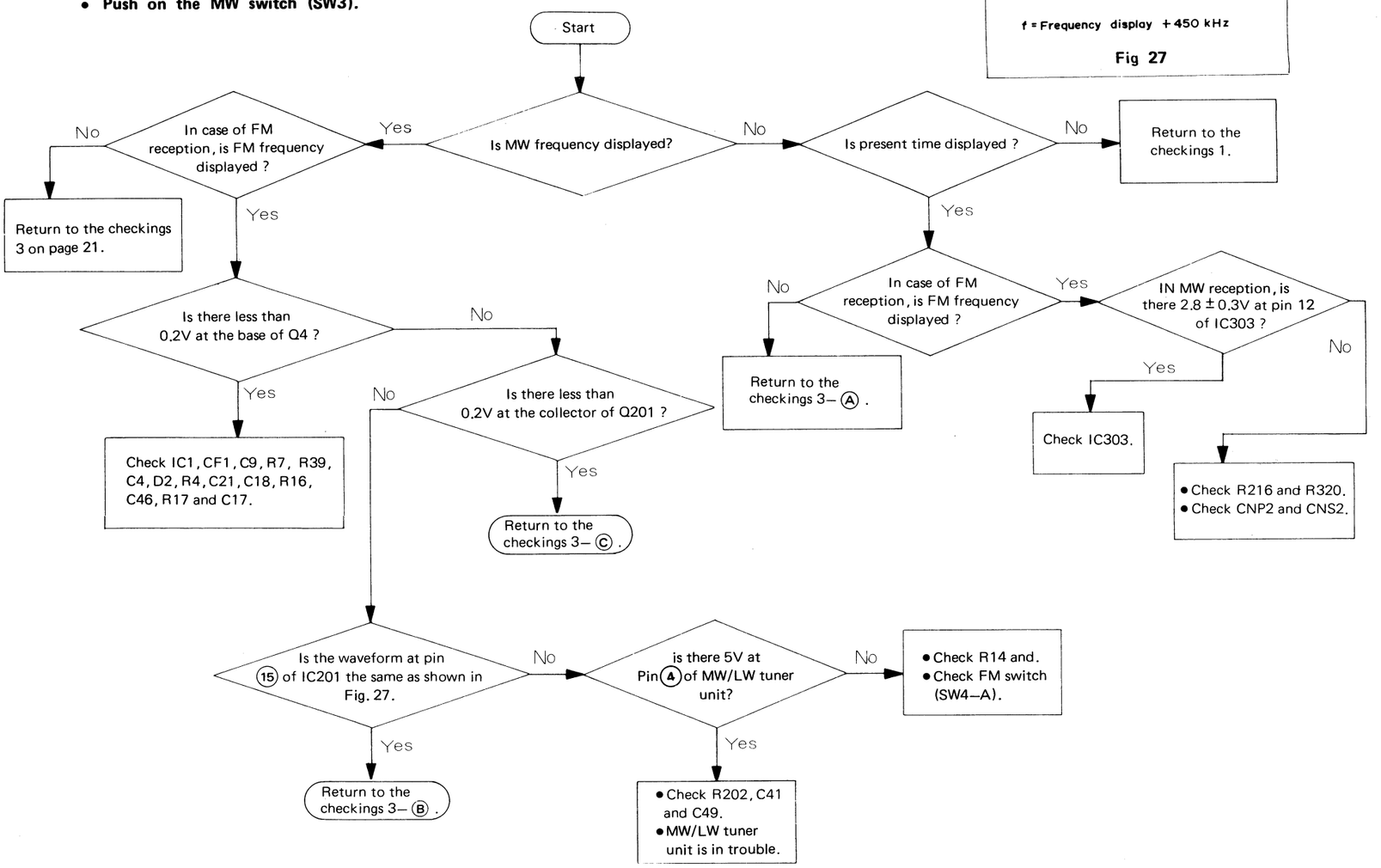
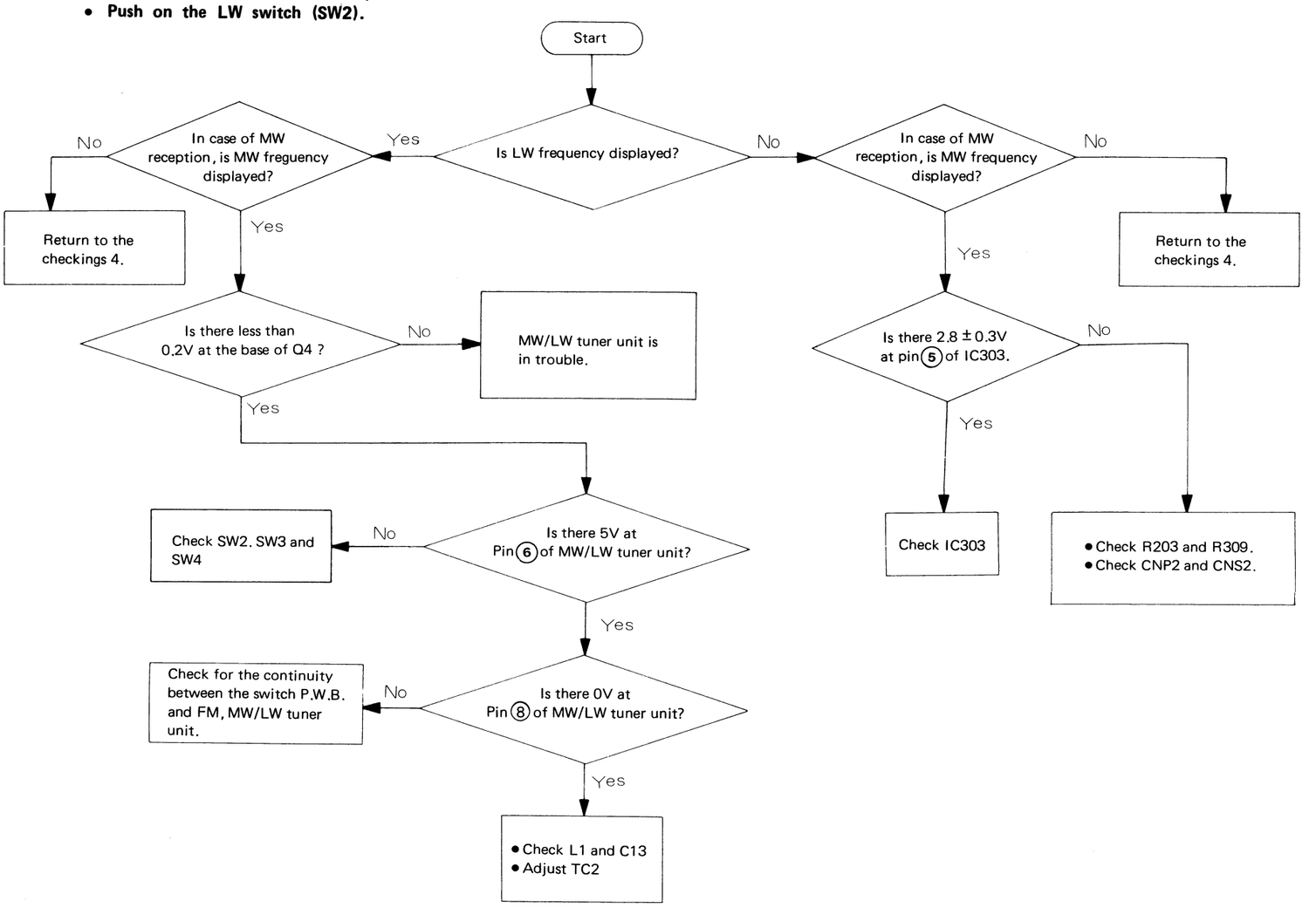


Fig 27

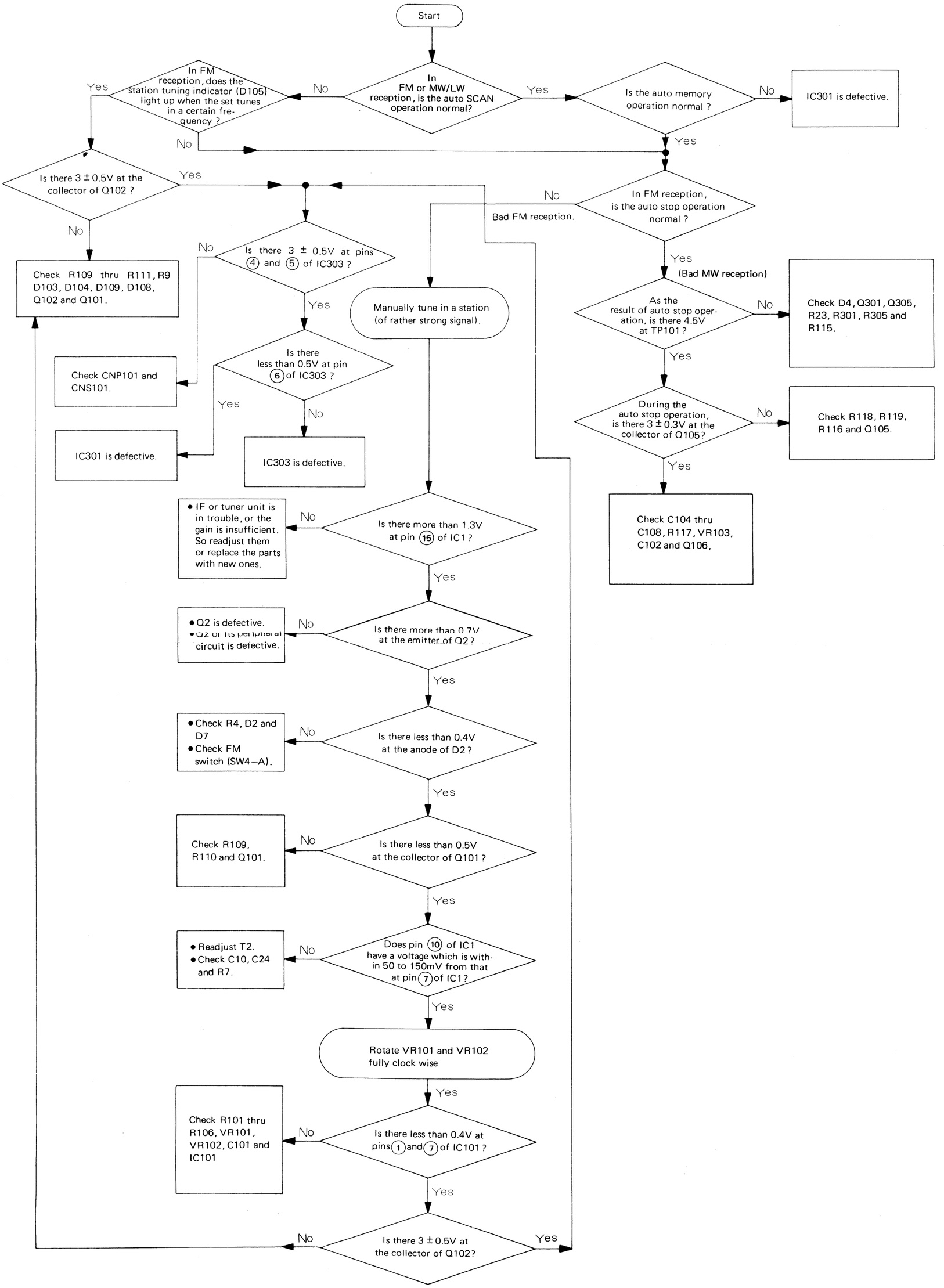

Start
Is MW frequency displayed?
Yes
No
In case of FM reception, is FM frequency displayed ?
No
Return to the checkings 3 on page 21.
Yes
Is there less than 0.2V at the base of Q4 ?
Yes
Check IC1, CF1, C9, R7, R39, C4, D2, R4, C21, C18, R16, C46, R17 and C17.
No
Is there less than 0.2V at the collector of Q201 ?
Yes
Return to the checkings 3– Ⓒ .
No
Is the waveform at pin ⑮ of IC201 the same as shown in Fig. 27.
Yes
Return to the checkings 3– Ⓑ .
No
is there 5V at Pin Ⓐ of MW/LW tuner unit?
Yes
• Check R202, C41 and C49.
• MW/LW tuner unit is in trouble.
No
• Check R14 and.
• Check FM switch (SW4–A).
Is present time displayed ?
No
Return to the checkings 1.
Yes
In case of FM reception, is FM frequency displayed ?
No
Return to the checkings 3– Ⓐ .
Yes
IN MW reception, is there 2.8 ± 0.3V at pin 12 of IC303 ?
Yes
Check IC303.
No
• Check R216 and R320.
• Check CNP2 and CNS2.

5. LW reception is improper or it doesn't work at all

- **Set the power switch at "on" position.**
- **Push on the LW switch (SW2).**

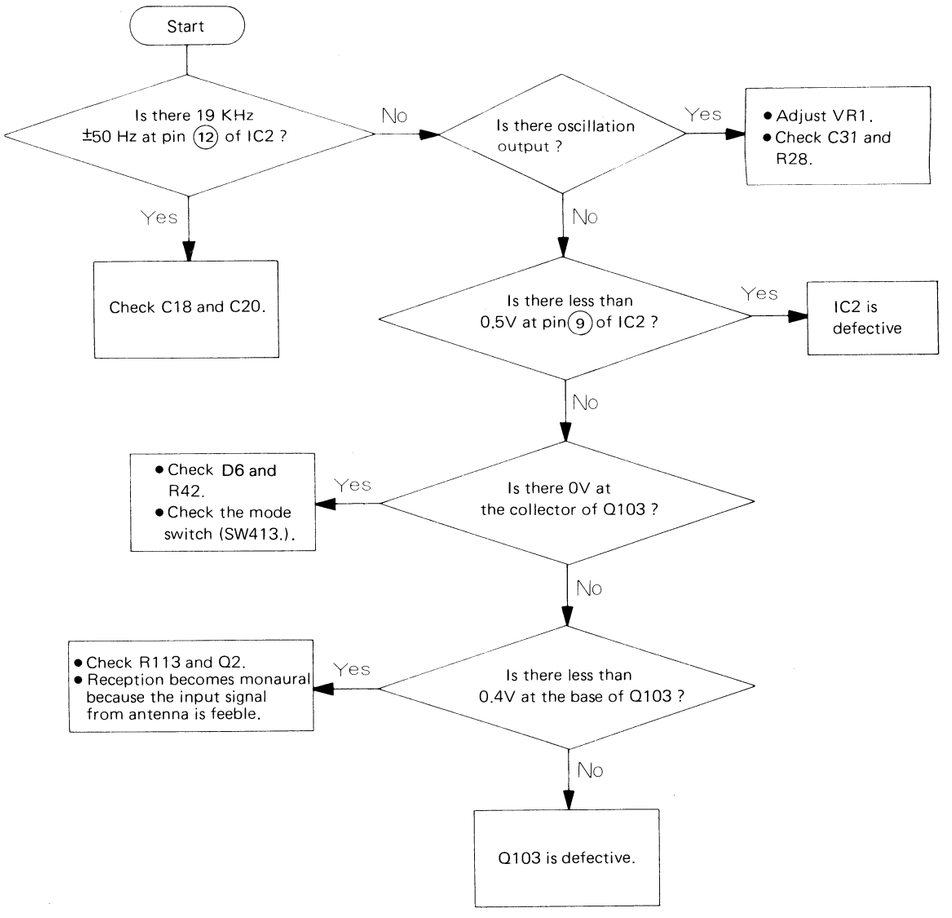

Start
Is LW frequency displayed?
Yes
No
In case of MW reception, is MW frequency displayed?
No
Return to the checkings 4.
Yes
Is there less than 0,2V at the base of Q4 ?
No
MW/LW tuner unit is in trouble.
Yes
Is there 5V at Pin ⑥ of MW/LW tuner unit?
No
Check SW2. SW3 and SW4
Yes
Is there 0V at Pin ⑧ of MW/LW tuner unit?
No
Check for the continuity between the switch P.W.B. and FM, MW/LW tuner unit.
Yes
• Check L1 and C13
• Adjust TC2
In case of MW reception, is MW frequency displayed?
No
Return to the checkings 4.
Yes
Is there 2.8 ± 0.3V at pin ⑤ of IC303.
No
• Check R203 and R309.
• Check CNP2 and CNS2.
Yes
Check IC303

6. AUTO STOP (SCANNING AUTOMATICALLY STOP) operation and auto memory operation (ASPM) are abnormal.

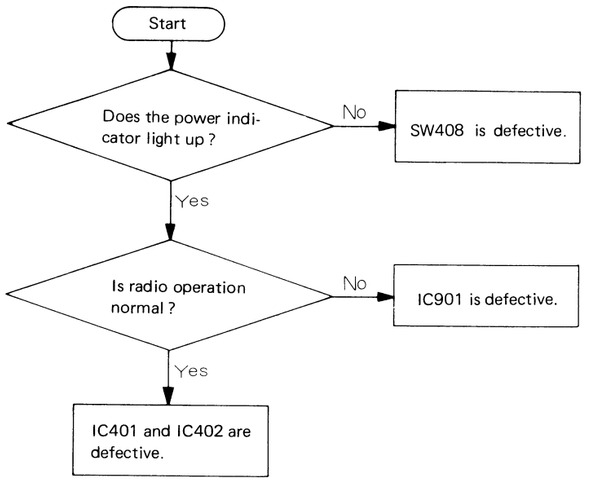

Start
In FM reception, does the station tuning indicator (D105) light up when the set tunes in a certain frequency ?
Yes
No
In FM or MW/LW reception, is the auto SCAN operation normal?
Yes
Is the auto memory operation normal ?
No
IC301 is defective.
Yes
Is there 3 ± 0.5V at the collector of Q102 ?
Yes
No
Check R109 thru R111, R9 D103, D104, D109, D108, Q102 and Q101.
No
Is there 3 ± 0.5V at pins ④ and ⑤ of IC303 ?
Yes
Check CNP101 and CNS101.
Is there less than 0.5V at pin ⑥ of IC303 ?
Yes
No
IC301 is defective.
IC303 is defective.
Manually tune in a station (of rather strong signal).
Bad FM reception.
No
In FM reception, is the auto stop operation normal ?
Yes
(Bad MW reception)
As the result of auto stop operation, is there 4.5V at TP101 ?
No
Check D4, Q301, Q305, R23, R301, R305 and R115.
Yes
During the auto stop operation, is there 3 ± 0.3V at the collector of Q105?
No
Check R118, R119, R116 and Q105.
Yes
Check C104 thru C108, R117, VR103, C102 and Q106,
• IF or tuner unit is in trouble, or the gain is insufficient. So readjust them or replace the parts with new ones.
No
Is there more than 1.3V at pin ⑮ of IC1 ?
Yes
• Q2 is defective.
• Q2 or its peripheral circuit is defective.
No
Is there more than 0.7V at the emitter of Q2 ?
Yes
• Check R4, D2 and D7
• Check FM switch (SW4–A).
No
Is there less than 0.4V at the anode of D2 ?
Yes
Check R109, R110 and Q101.
No
Is there less than 0.5V at the collector of Q101 ?
Yes
• Readjust T2.
• Check C10, C24 and R7.
No
Does pin ⑩ of IC1 have a voltage which is within 50 to 150mV from that at pin ⑦ of IC1?
Yes
Rotate VR101 and VR102 fully clock wise
Yes
Check R101 thru R106, VR101, VR102, C101 and IC101
No
Is there less than 0.4V at pins ① and ⑦ of IC101 ?
Yes
No
Is there 3 ± 0.5V at the collector of Q102?
Yes

7. No FM stereo reception is enabled.

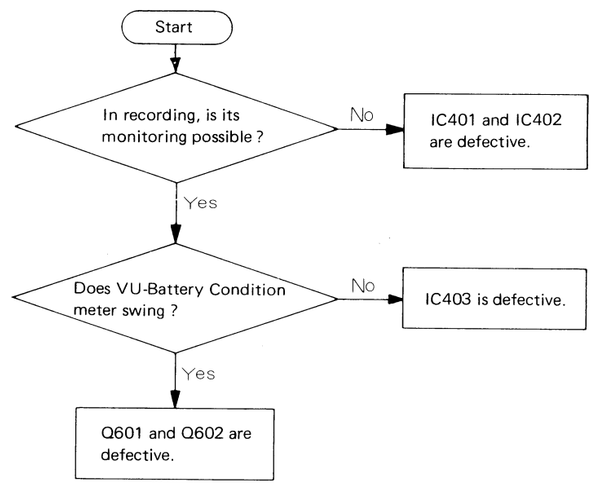
- **Set the power switch (SW406) at "on" position.**
- **Push on FM switch (SW3).**
- **Set the stereo mode selector switch (SW413) at "st" position.**


Start
Is there 19 KHz ±50 Hz at pin (12) of IC2 ?
No
Is there oscillation output ?
Yes
• Adjust VR1.
• Check C31 and R28.
Yes
Check C18 and C20.
No
Is there less than 0.5V at pin (9) of IC2 ?
Yes
IC2 is defective
No
• Check D6 and R42.
• Check the mode switch (SW413.).
Yes
Is there 0V at the collector of Q103 ?
No
• Check R113 and Q2.
• Reception becomes monaural because the input signal from antenna is feeble.
Yes
Is there less than 0.4V at the base of Q103 ?
No
Q103 is defective.

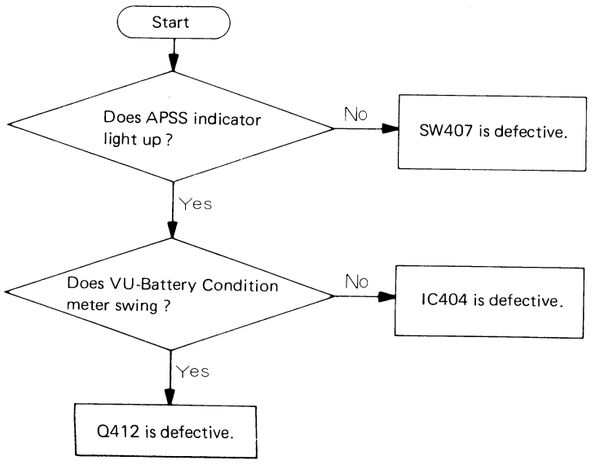
8. No playback



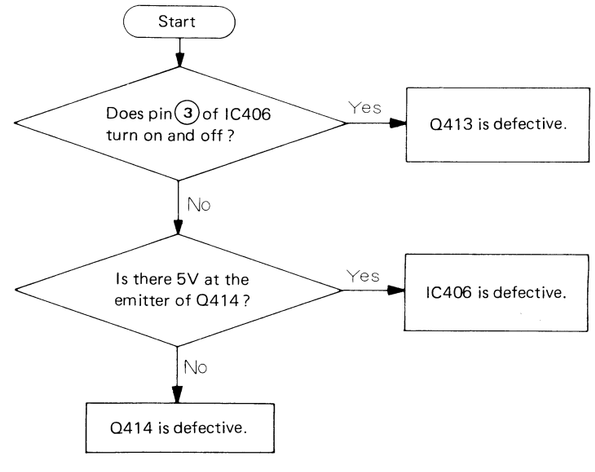
9. No recording



10. No APSS operation



11. Tape ejects when it is traveling.



■ NOTES ON WIRING DIAGRAM

1. SW1 is the radio sensitivity control switch and set at "DX" position.
2. SW2 is the LW switch and set at ON position.
3. SW3 is the MW switch and set at OFF position.
4. SW4 is the FM switch and set at OFF position.
5. SW401 (A to G) is the record/playback switch and set at record position.
6. SW402 (A to E) is the tape selector switch and set at "normal" position.
7. SW403 is the switch which is inside the Input/Output DIN Type Socket.
8. SW404 is the switch which is inside the mixing microphone socket.
9. SW406 is the power switch and set at off/tape position.
10. SW407 is the APSS (forward APSS/rewind APSS) switch and set at OFF position.
11. SW408 is the mechanism switch and set at ON position.
12. SW409 (A,B) is the switch whichis inside the Headphones socket
13. SW410 is the pause switch and set at OFF position.
14. SW411 is the APSS switch and set at OFF position.
15. SW412 is the battery check/dial Illumination switch and set at OFF position.
16. SW413 (A to C) is the stereo mode selector switch and set at "st." posiiton.
17. SW414 is the beat cancelling switch and set at "B" position.
18. SW415 is the switch which is inside the external microphone socket (left)
19. SW416 is the switch which is inside the external microphone socket (right).
20. To differentiate the units of resistors, such symbols as K and M are used: the symbol K means 1000 ohms and the symbol M means 1 Meg. ohm (1/4W) and the resistor without any symbol is ohm-type resistor.
21. To indicate the unit of capacitor, a symbol P is used: this symbol P means picofarad (pF) and the unit of the capacitor without such symbol is microfarad (μF). ML means mylar type capacitor.
22. As to electrolytic capacitor, the expression "capacitance/withstand voltage" is used.
23. For voltages at each point of the tuner, they are indicated in parentheses for MW and the values without parentheses are for FM. In any case, the voltage is measured with no signal given, by using VTVM.

■ CAUTIONS ON HANDLING C-MOS LSI

As for C-MOS LSI, either the input or output terminal has remarkably high impedance as compared with ordinary semiconductor IC. Therefore, C-MOS LSI is liable to be affected by the induction of near-by high-tension power source or AC power source and the human body discharge: at worst, it is so damaged that its quality will not be recovered again. Therefore, pay due attention to the following when handling it.

- **Caution on Servicing**

When the LSI Is found defective on your servicing, repair or replace it as follows:

(1) A soldering tool in use should have a load resistance of more than 1 Meg. ohm to be connected with ground.
(2) Ground a bench.
(3) Before removing LSI from P.W.B., be sure to turn off the power switch.
(4) When inserting LSI to P.W.B., ground the earth terminal of P.W.B.
(5) Be sure to ground the earth terminal of DC power source.
(6) Be sure to ground the human body across a load resistance of more than 1 Meg. ohm: otherwise the body encounters large current.
(7) After the repairing, be sure to remove soldering flux and perform moisture-proof treatment.

- **Cautions on Preservation**

To preserve C-MOS LSI in safe, all the terminals should be kept at the same potential in the following methods.

(1) Pack it with aluminium foil, or
(2) Put it in a special case for LSI.

■ VOLTAGE MEASUREMENT USING A TESTER

Using a tester (of internal resistance 20 kohms/V) is allowed for measuring voltages at each point of the set, but it must never be used for the connectors (IC101, IC201 and IC301) of C-MOS LSI. If used, the tester may damage the LSI since its input/output terminals have much high impedance as described in "CAUTIONS ON HANDLING C-MOS LSI."

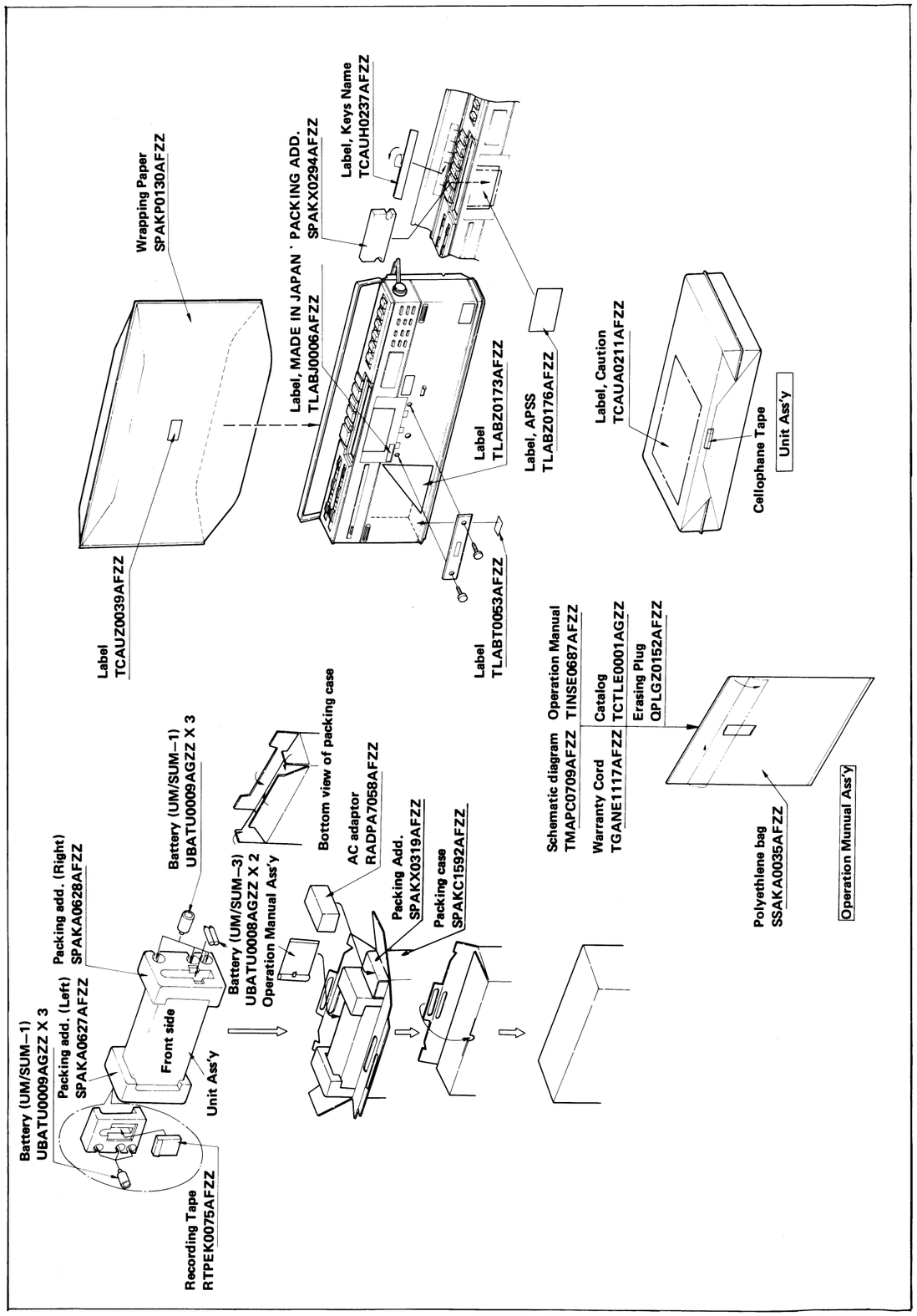


Figure 34 PACKING METHOD (GF-8E For UK Only)

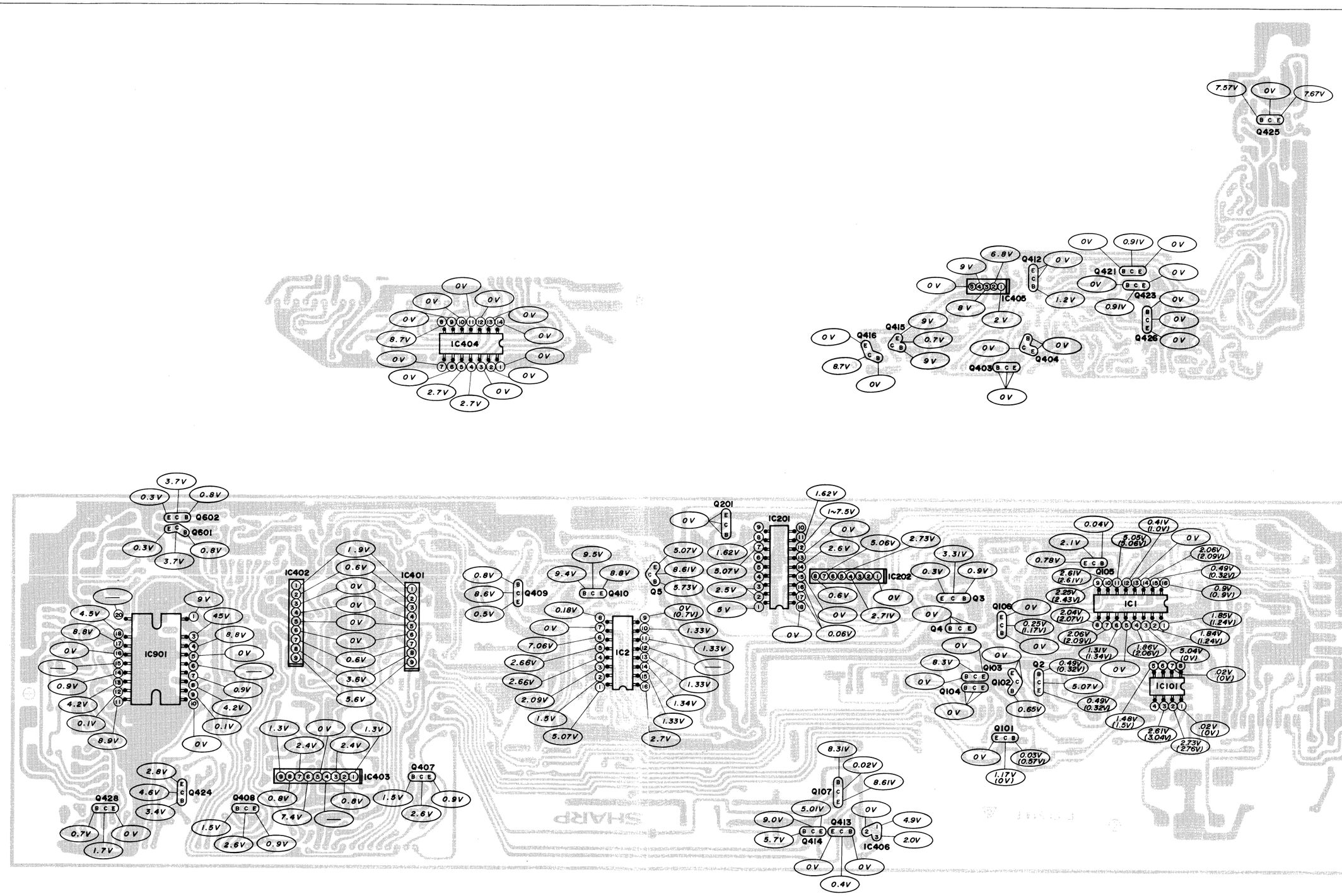
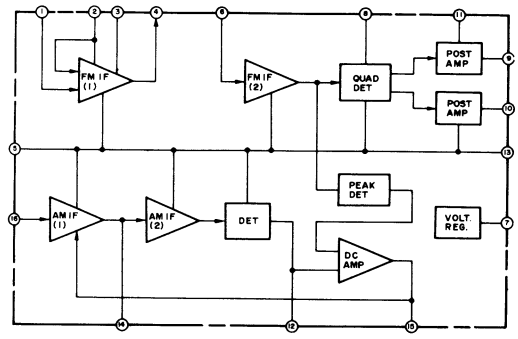


Figure 35 VOLTAGE GUIDE ON P.W. BOARD

VHIHA12413/-1 (IC1)



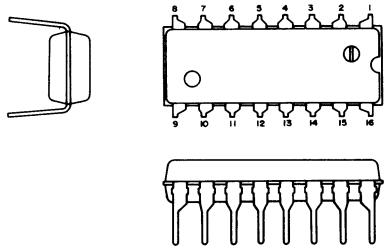
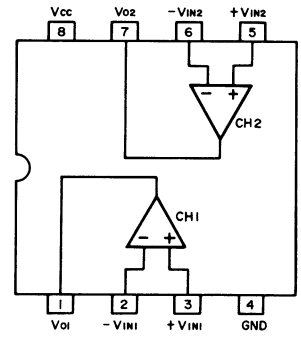


Figure 37–1 BLOCK DIAGRAM OF IC

VHIMN6914//-1 (IC101)



① Output
② Inverting Input
③ Non Inverting Input
④ GND
⑤ Non Inverting Input
⑥ Inverting Input
⑦ Output
⑧ Vcc

Figure 37–2 TOP VIEW OF IC

VHILR3626//-1 (IC301)

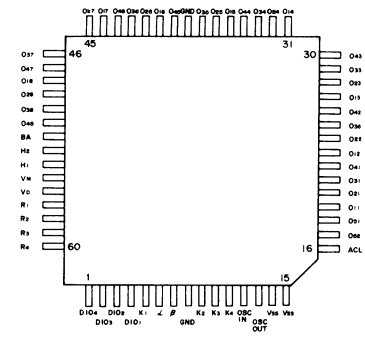
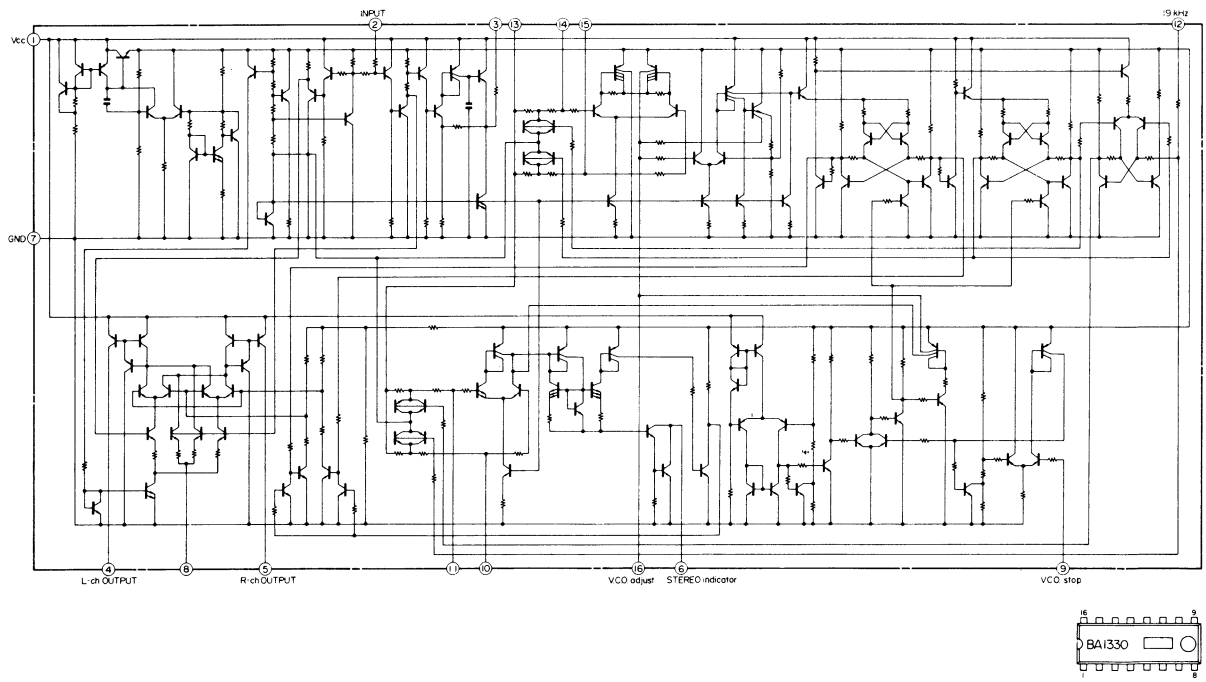


Figure 37–3 TOP VIEW OF IC

RH-IX1109AFZZ (IC2)



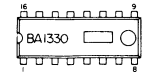


Figure 37–4 EQUIVALENT CIRCUIT OF IC

VHIUPD2819C1F (IC201)

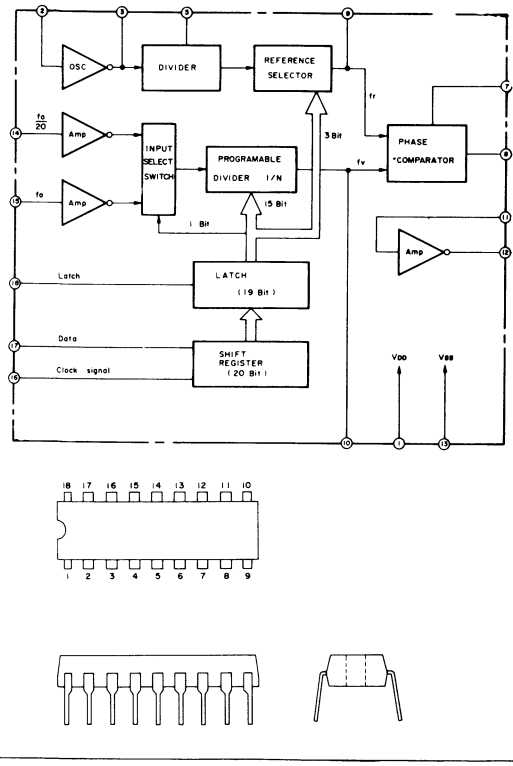
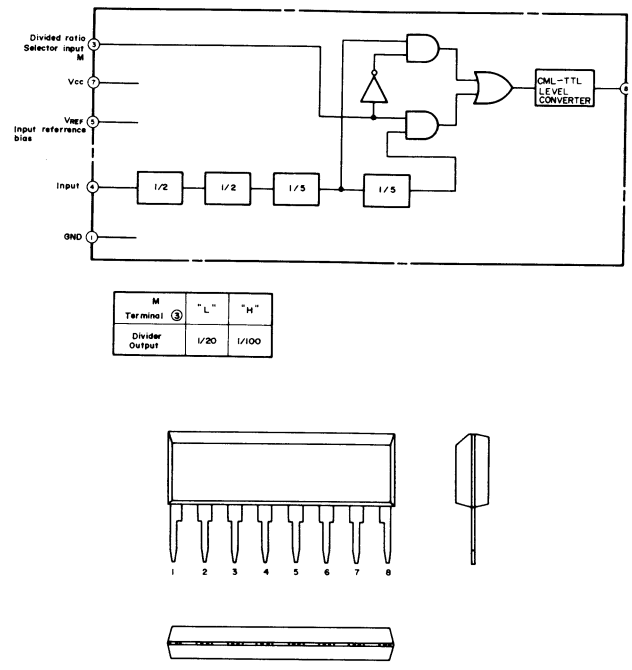


Figure 38–1 BLOCK DIAGRAM OF IC

VHIM54459//-1 (IC202)



M Terminal ③	"L"	"H"
Divider Output	1/20	1/100

Figure 38–2 BLOCK DIAGRAM OF IC

VHITC40H000P1 (IC302, IC303)

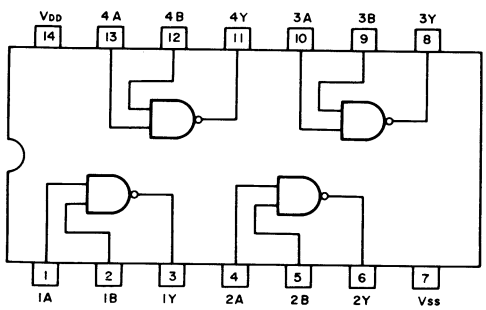
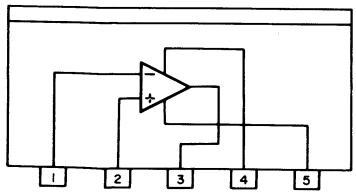


Figure 38–3 TOP VIEW OF IC

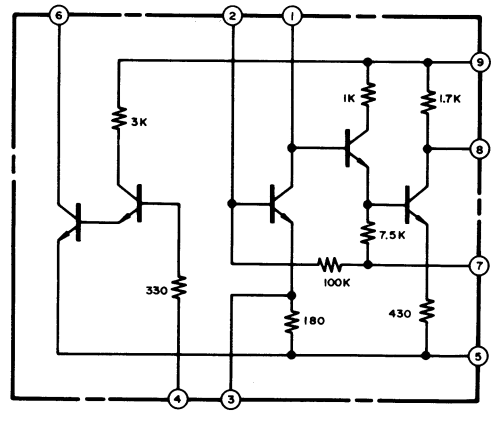
VHIM51204AF1A (IC405)



① Inverting Input
② Non Inverting Input
③ Power
④ Power
⑤ GND

Figure 38–4 BACK VIEW OF IC

VHILA3210AF1A (IC401, IC402)



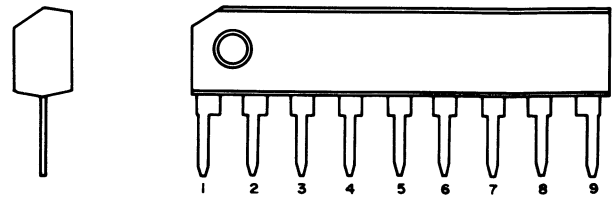


Figure 38–5 EQUIVALENT CIRCUIT OF IC

VHIAN7311AF1A (IC403)

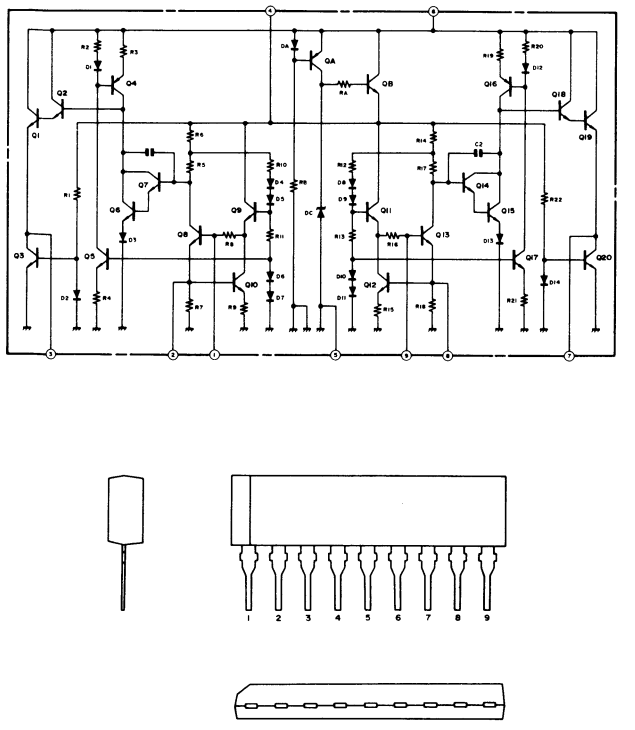


Figure 39–1 EQUIVALENT CIRCUIT OF IC

VHILB1416//-1 (IC404)

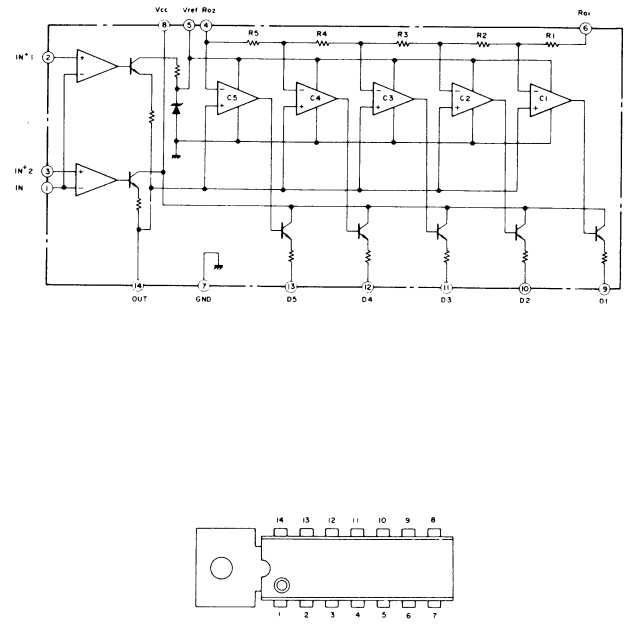


Figure 39–2 EQUIVALENT CIRCUIT OF IC

VHIMN6835//-1 (IC406)

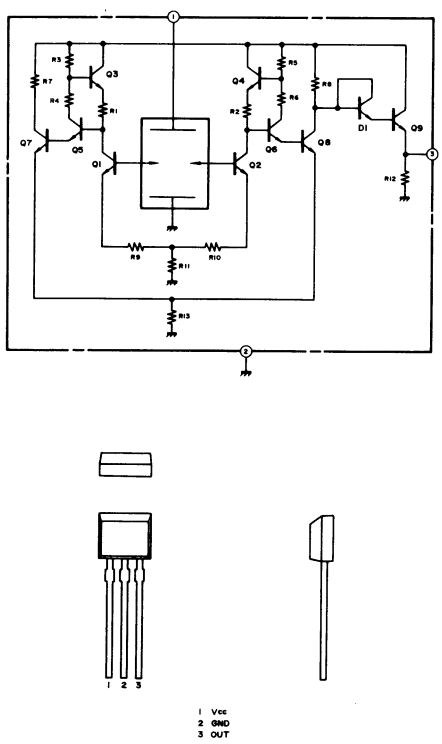


Figure 39–3 EQUIVALENT CIRCUIT OF IC

VHILA4125T/-1 (IC901)

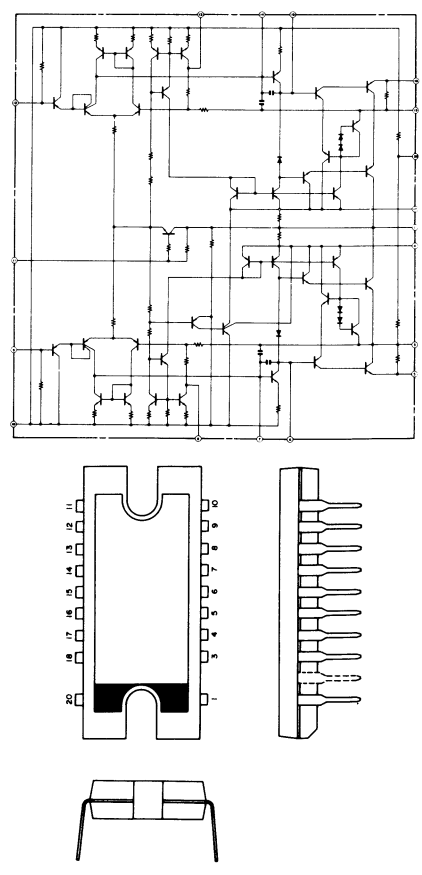


Figure 39–4 EQUIVALENT CIRCUIT OF IC

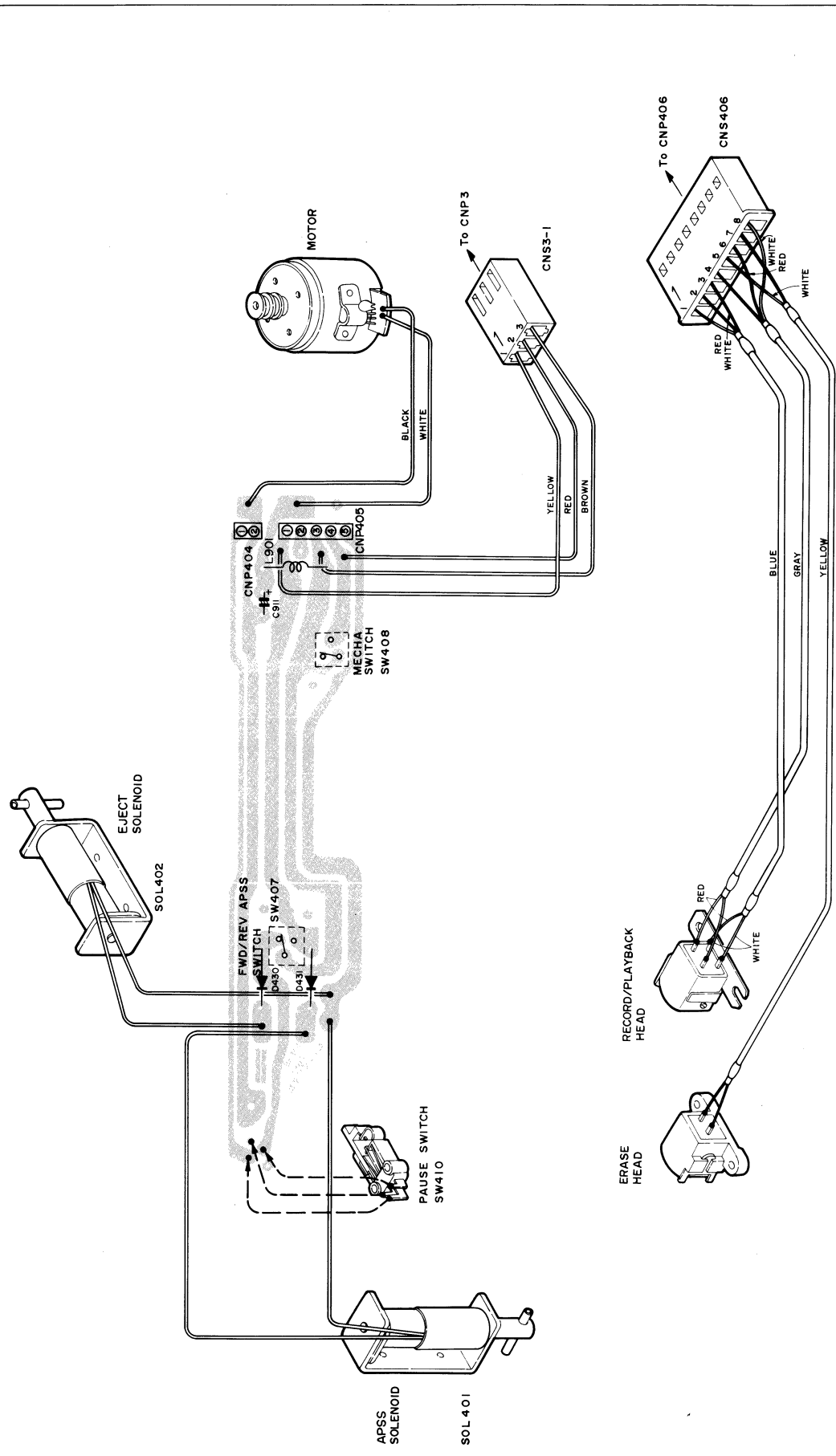


Figure 40 WIRING SIDE OF P.W. BOARD

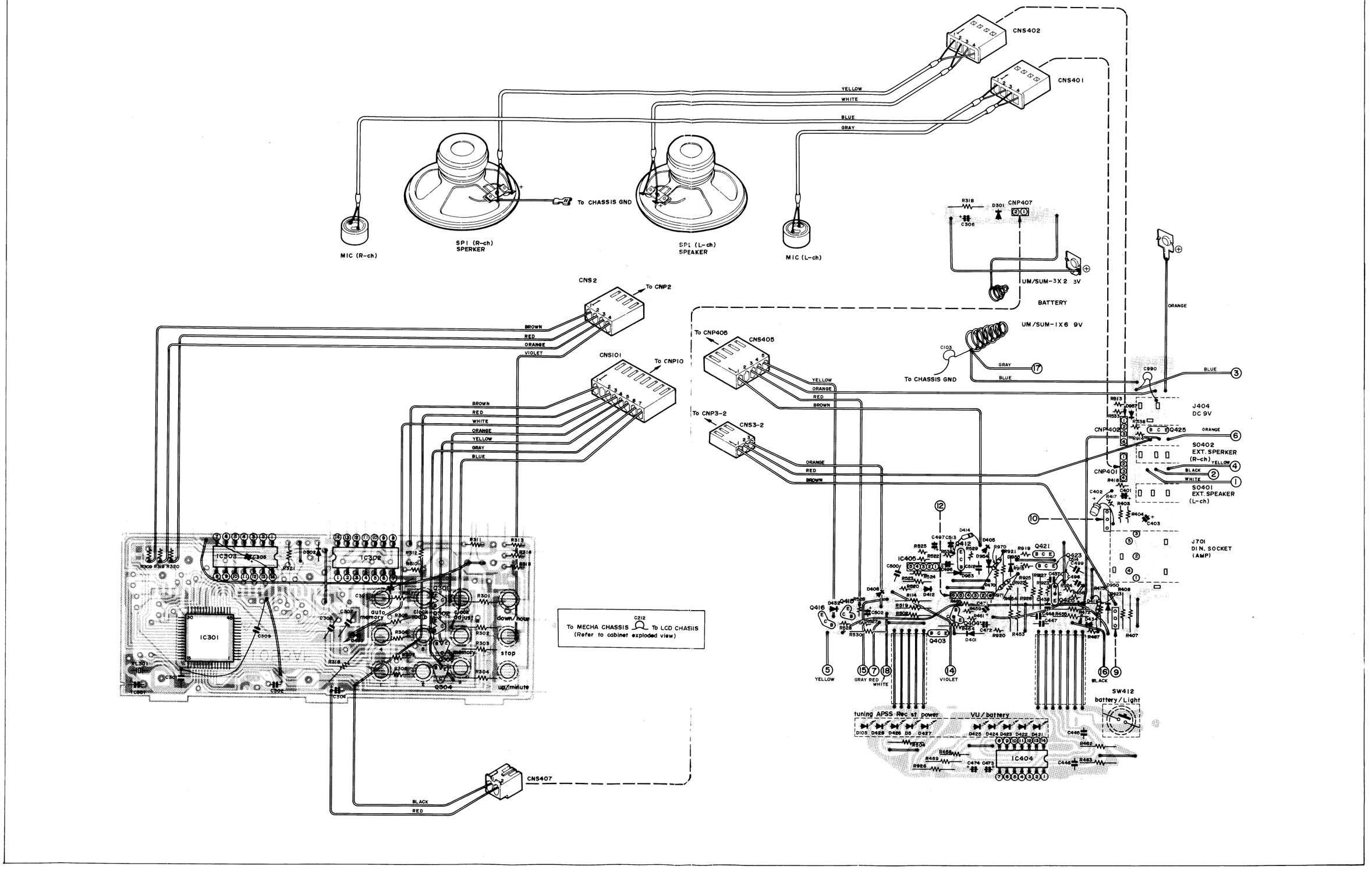
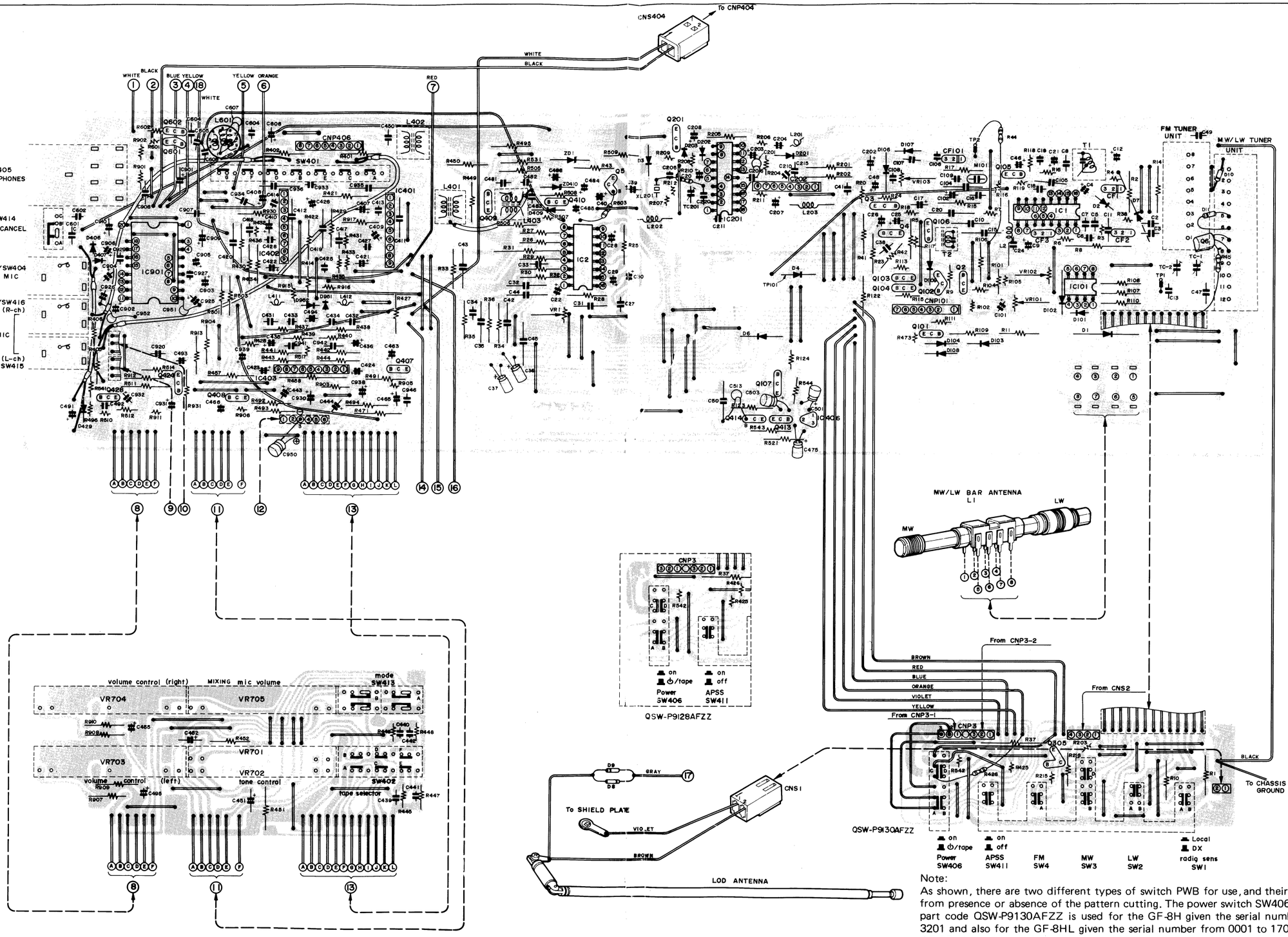
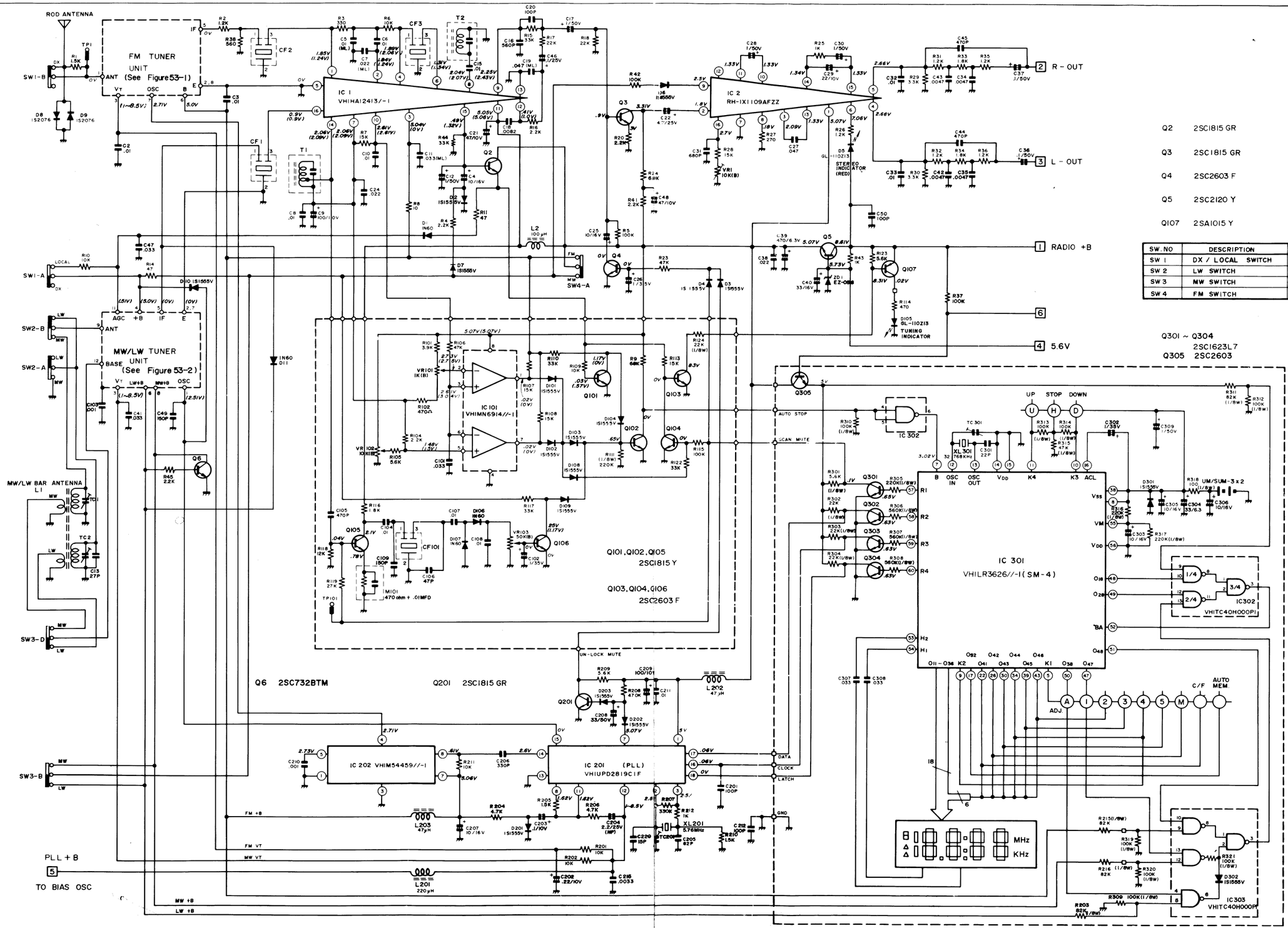


Figure 41 WIRING SIDE OF P.W. BOARD



Note:
As shown, there are two different types of switch PWB for use, and their difference is seen from presence or absence of the pattern cutting. The power switch SW406 identified by the part code QSW-P9130AFZZ is used for the GF-8H given the serial number from 0001 to 3201 and also for the GF-8HL given the serial number from 0001 to 1701 and also for the GF-8E given the serial number from 0001 to 1000. On the other hand, the power switch SW406 identified by the part code QSW-P9128AFZZ is used for the sets having other than the abovementioned serial numbers, whichever they may belong to the GF-8H/HL/E.

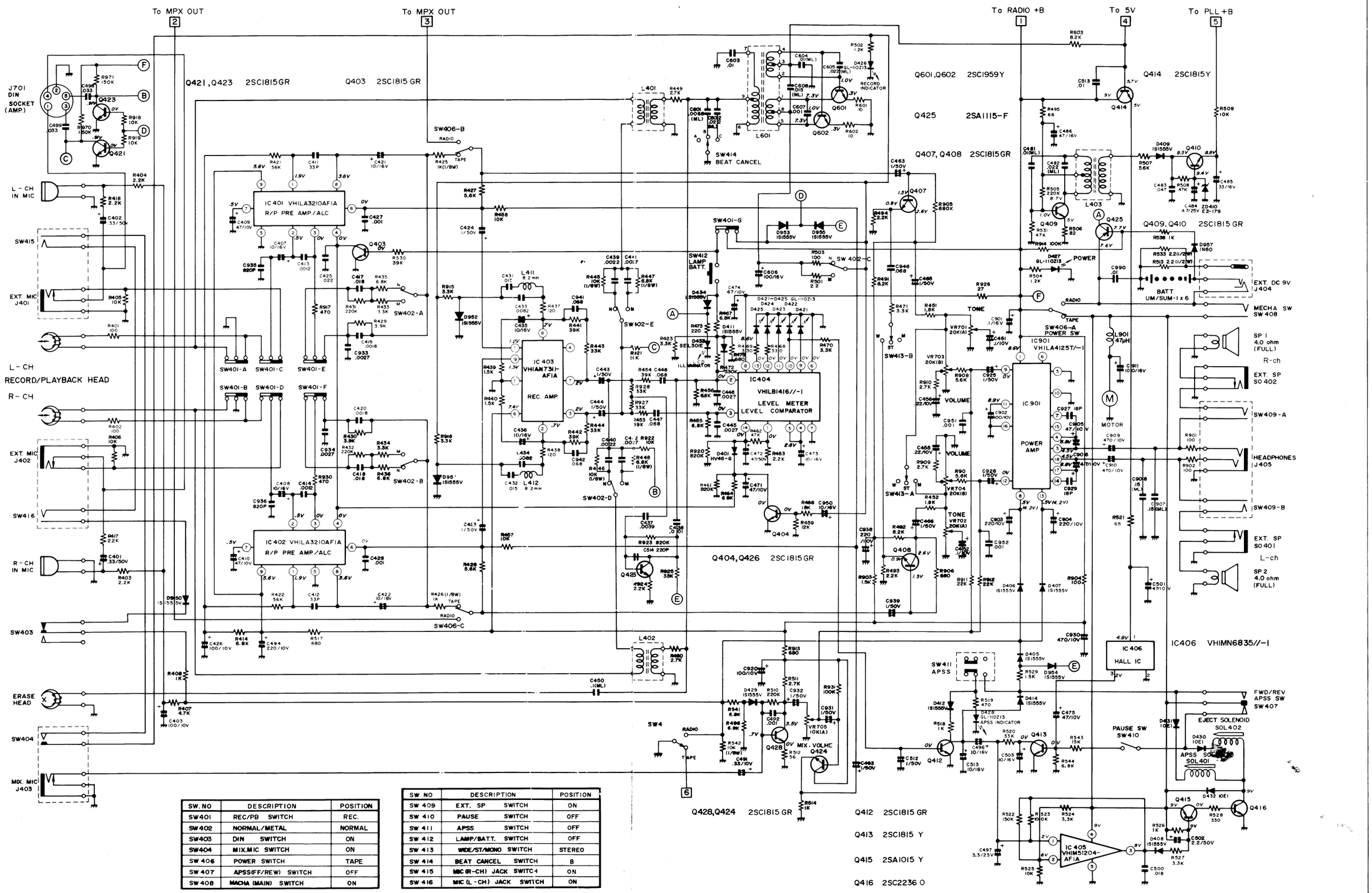
Figure 43 WIRING SIDE OF P.W. BOARD



SW. NO	DESCRIPTION	POSITION
SW 1	DX / LOCAL SWITCH	LOCAL
SW 2	LW SWITCH	ON
SW 3	MW SWITCH	OFF
SW 4	FM SWITCH	OFF

Specifications or wiring diagrams of this model are subject to change for the improvement without prior notice.

Figure 45 SCHEMATIC DIAGRAM



SW. NO	DESCRIPTION	POSITION
SW401	REC/PB SWITCH	REC.
SW402	NORMAL/METAL	NORMAL
SW403	DIN SWITCH	ON
SW404	MIX.MIC SWITCH	ON
SW 406	POWER SWITCH	TAPE
SW 407	APSS(FF/REW) SWITCH	OFF
SW 408	MACHA (MAIN) SWITCH	ON

SW NO	DESCRIPTION	POSITION
SW 409	EXT. SP SWITCH	ON
SW 410	PAUSE SWITCH	OFF
SW 411	APSS SWITCH	OFF
SW 412	LAMP/BATT. SWITCH	OFF
SW 413	WIDE/ST/MONO SWITCH	STEREO
SW 414	BEAT CANCEL SWITCH	B
SW 415	MIC (R-CH) JACK SWITCH	ON
SW 416	MIC (L-CH) JACK SWITCH	ON

Specifications or wiring diagrams of this model are subject to change for the improvement without prior notice.

Figure 47 SCHEMATIC DIAGRAM

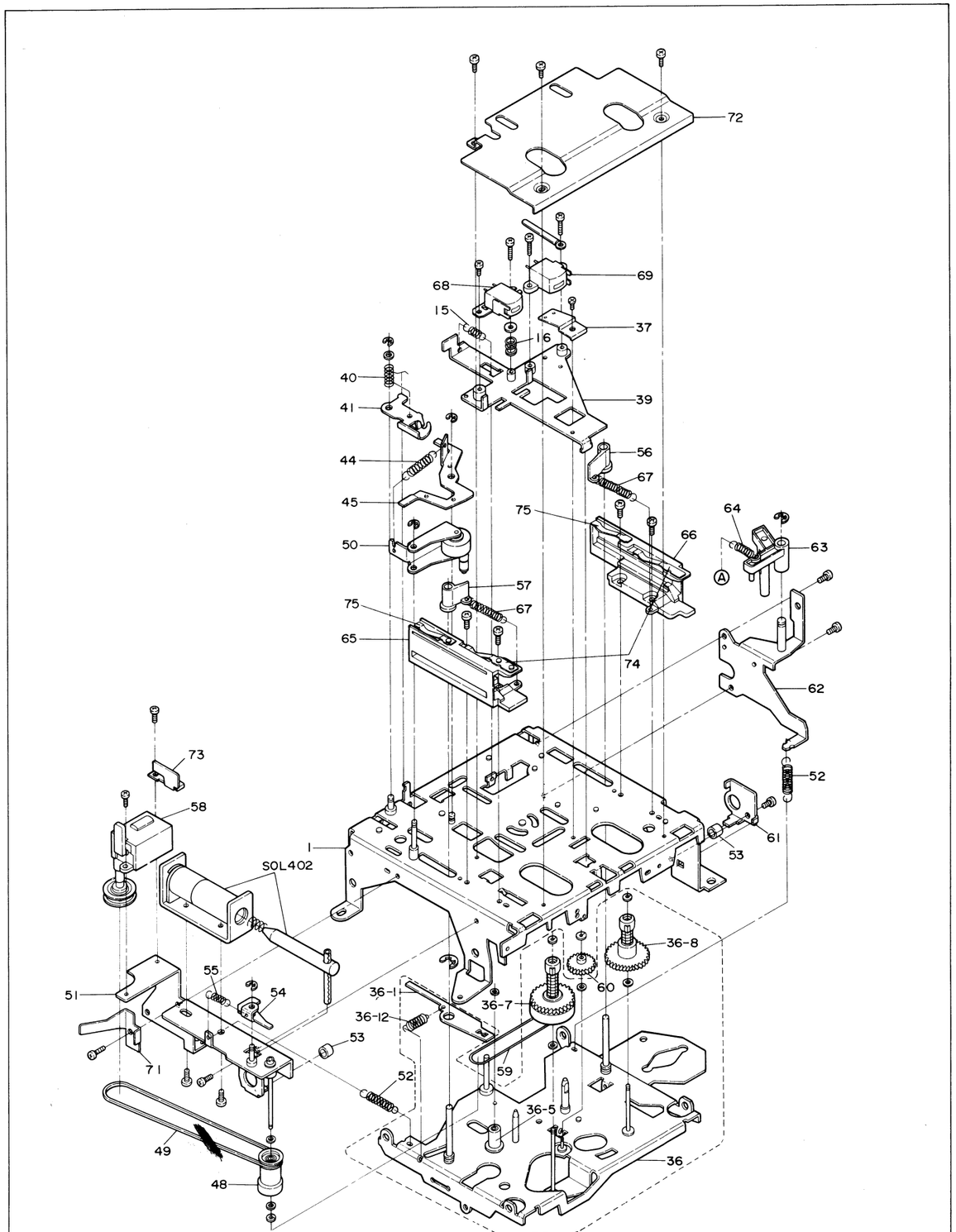


Figure 49 MECHANISM EXPLODED TOP VIEW

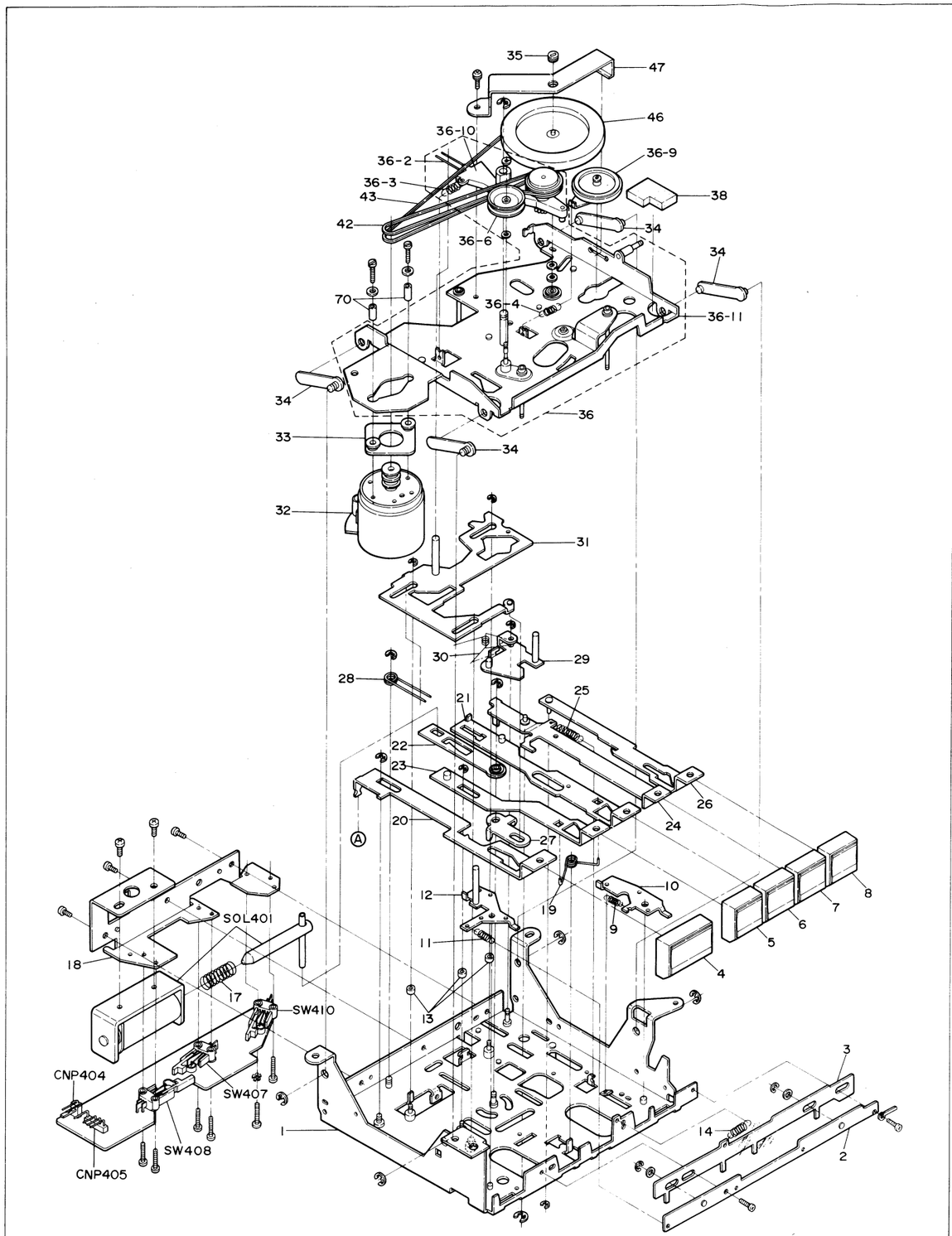


Figure 50 MECHANISM EXPLODED BOTTOM VIEW

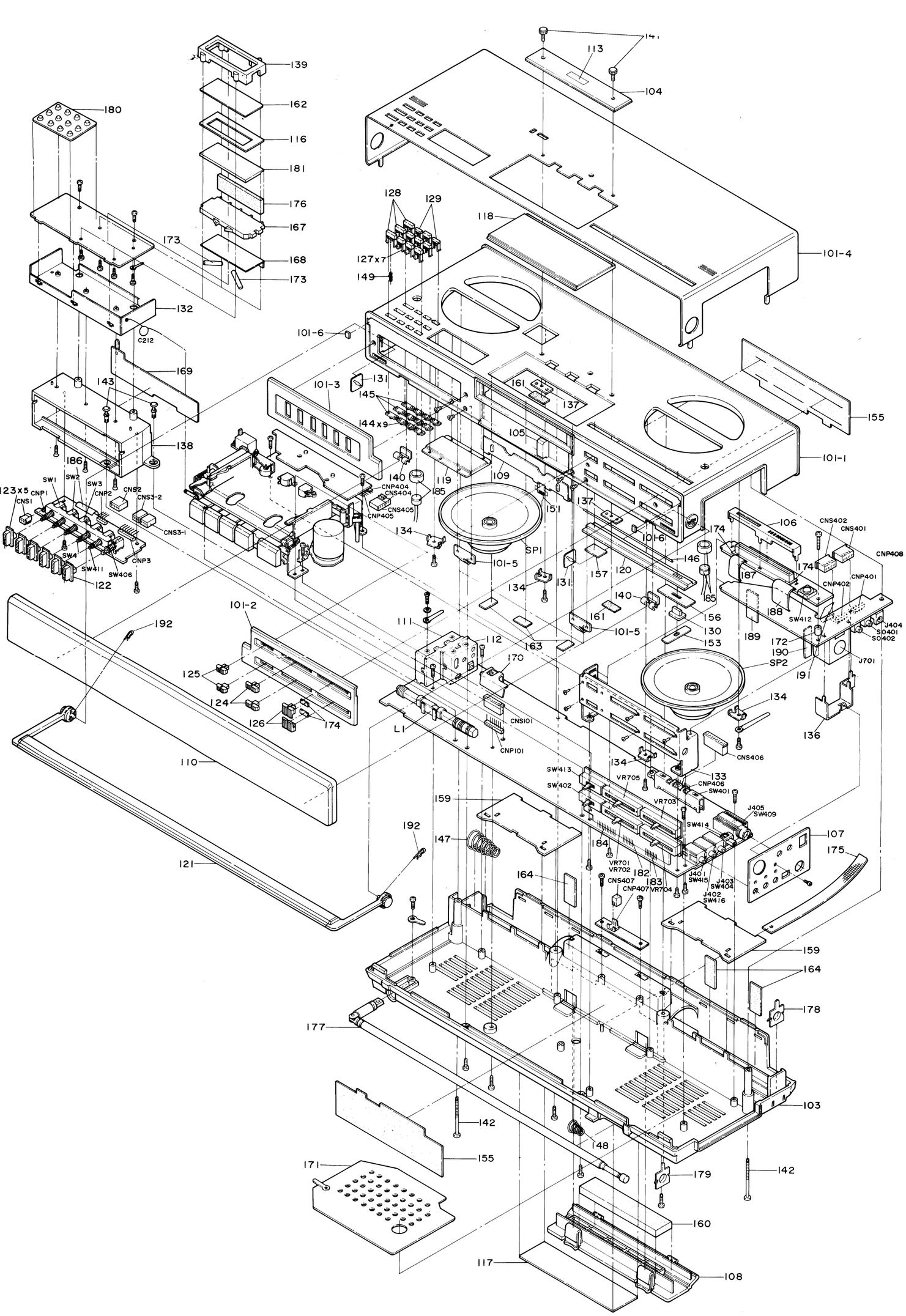
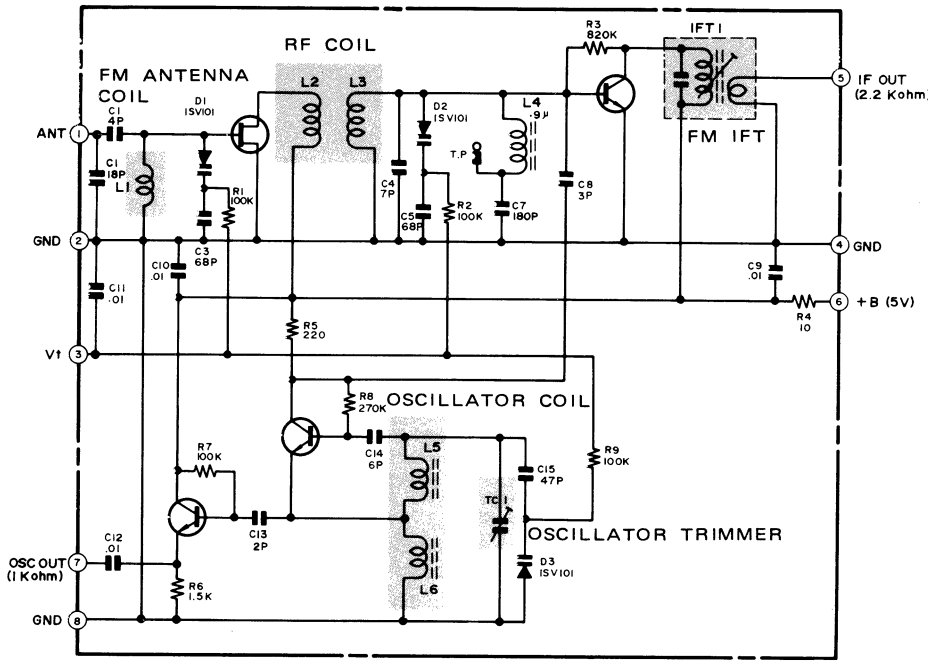
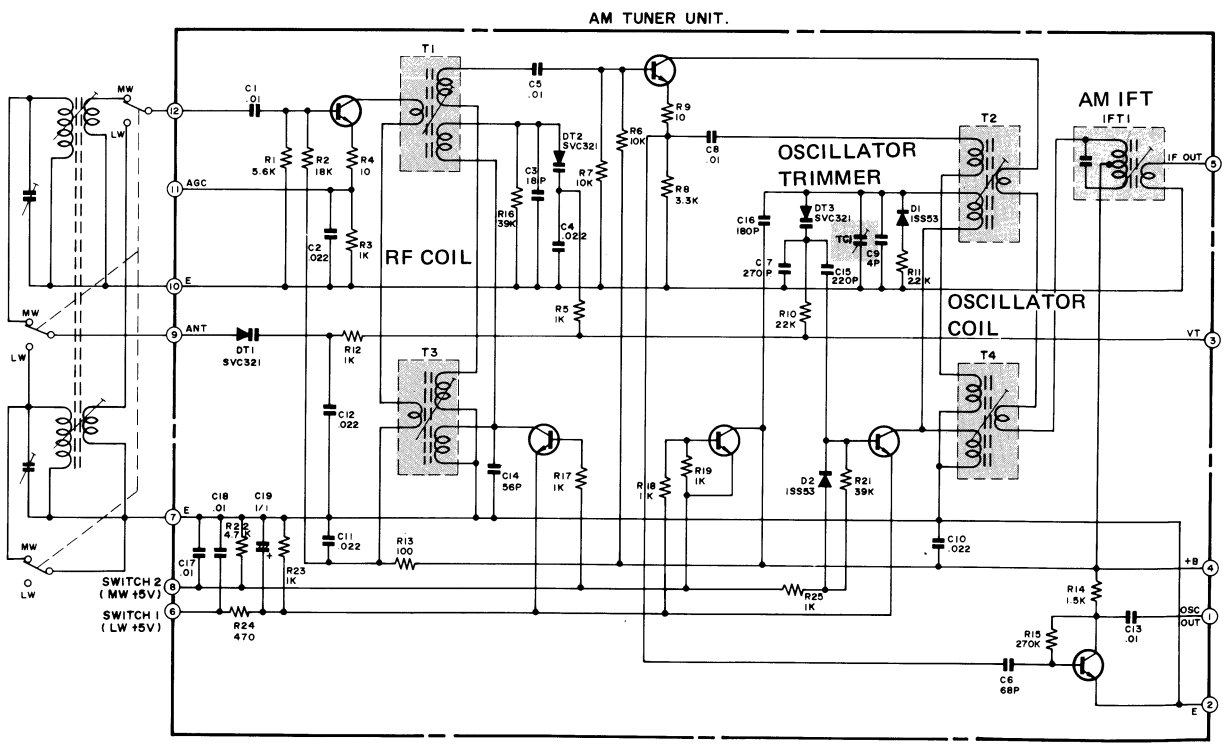


Figure 51 CABINET EXPLODED VIEW



The FM tuner unit shown above is supplied as an assembly unit and to supply its constituent parts separatory is not possible.

Figure 53–1 SCHEMATIC DIAGRAM OF FM TUNER UNIT



The MW/LW tuner unit shown above is supplied as an assembly unit and to supply its constituent parts separatory is not possible.

Figure 53–2 SCHEMATIC DIAGRAM OF MW/LW TUNER UNIT

REPLACEMENT PARTS LIST

"HOW TO ORDER REPLACEMENT PARTS"

To have your order filled promptly and correctly, please furnish the following information.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

NOTES: Be sure to use regular parts for securing the safety and reliability of the set. Parts marked with " ⚠ " and parts cross hatched (in black) are especially important for maintaining the safety and protecting ability of the set. Be sure to replace them with parts of specified part number.

REF. NO.	PART NO.	DESCRIPTION	CODE
		INTEGRATED CIRCUITS	
IC1	VHIHA12413/-1	FM/MW IF Amp./Detector (HA12413)	AL
IC2	RH-IX1109AFZZ	PLL FM MPX Demodulator (BA1330)	AL
IC101	VHIMN6914//-1	Comparator (MN6914)	AG
IC201	VHIUPD2819C1F	PLL (D2819C)	AY
IC202	VHIM54459//-1	Pre-scaler (M54459)	AR
IC301	VHILR3626//-1	Microcomputor (LR3626)	BD
IC302, IC303	VHITC40H000P1	Interface (TC40H000P)	AG
IC401, IC402	VHILA3210AF1A	Pre-amp./ALC (LA3210A)	AE
IC403	VHIAN7311AF1A	Record (AN7311)	AG
IC404	VHILB1416//-1	Level Meter (LB1416)	AK
IC405	VHIM51204AF1A	Auto Eject (M51204)	AG
IC406	VHIMN6835//-1	Hall IC (MN6835)	AG
IC901	VHILA4125T/-1	Main Amp. (LA4125T)	AQ
		TRANSISTORS	
Q2	VS2SC1815GR-1	AGC Amp. (2SC1815GR)	AB
Q3	VS2SC1815GR-1	AF Amp. (2SC1815GR)	AB
Q4	VS2SC2603-F-1	Muting (2SC2603F)	AB
Q5	VS2SC2120-Y-1	Voltage Stabilizer (2SC2120Y)	AC
Q6	VS2SC732BTM-1	+B Switching	
Q101	VS2SC1815Y/-1	DC Amp. (2SC1815Y)	AB
Q102	VS2SC1815Y/-1	Switching (2SC1815Y)	AB
Q103, Q104	VS2SC2603-F-1	Switching (2SC2603F)	AB
Q105	VS2SC1815Y/-1	450kHz Amp. (2SC1815Y)	AB
Q106	VS2SC2603-F-1	DC Amp. (Scan Stop) (2SC2603F)	AB
Q107	VS2SA1015Y/-1	LED Driver (2SA1015Y)	AC
Q201	VS2SC1815GR-1	Un-lock Muting (2SC1815GR)	AB
Q301, Q302, Q303, Q304	VS2SC1623L7-1	Buffer Amp. (2SC1623L7)	AB
Q305	VS2SC2603-F-1	Inter Face (2SC2603F)	AB
Q403	VS2SC1815GR-1	ALC Prevent (2SC1815GR)	AB
Q404	VS2SC1815GR-1	Record Amp. (2SC1815GR)	AB
Q407, Q408	VS2SC1815GR-1	Stereo Wide Amp. (2SC1815GR)	AB
Q409	VS2SC1815GR-1	DC-DC Converter (2SC1815GR)	AB
Q410	VS2SC1815GR-1	Ripple Filter (2SC1815GR)	AB
Q412	VS2SC1815GR-1	APSS Amp. (2SC1815GR)	AB
Q413	VS2SC1815Y/-1	Auto Eject (2SC1815Y)	AB
Q414	VS2SC1815Y/-1	DC Power of IC406 (2SC1815Y)	AB
Q415	VS2SA1015Y/-1	Pre-driver (2SA1015Y)	AC
Q416	VS2SC2236O/-1	Driver (2SC2236O)	AD
Q421, Q423	VS2SC1815GR-1	DIN Amp. (2SC1815GR)	AB
Q424	VS2SC1815GR-1	Mixing Mic Amp. (2SC1815GR)	AB
Q425	VS2SA115-F/-1	Switching (2SA115-F)	AC
Q426	VS2SC1815GR-1	APSS Amp. (2SC1815GR)	AB
Q428	VS2SC1815GR-1	Mixing Mic Amp. (2SC1815GR)	AB
Q601, Q602	VS2SC1959Y/-1	Bias Oscillation (2SC1959Y)	AC
		DIODES	
D1	VHD1N60////-1	AGC (1N60)	AB
D2	VHD1S1555V/1G	AGC Time Constant Switching (1S1555V)	AB
D3, D4	VHD1S1555V/1G	Muting (1S1555V)	AB
D6	VHD1S1555V/1G	Auto Scan Protector (1S1555V)	AB
D7	VHD1S1555V/1G	Auto Scan (1S1555V)	AB
D8, D9	VHD1S2076//-1	Static Protector (1S2076)	AB
D10	VHD1S1555V/1G	+B (1S1555V)	AB
D11	VHD1N60////-1	MW Oscillation Countermeasure (1N60)	AB
D101, D102, D104	VHD1S1555V/1G	FM Scan Stop (1S1555V)	AB
D103	VHD1S1555V/1G	Switching (1S1555V)	AB
D106, D107	VHD1N60////-1	MW/LW Scan Stop Signal Detector (1N60)	AB
D108	VHD1S1555V/1G	Switching (1S1555V)	AB
D109	VHD1S1555V/1G	Switching (1S1555V)	AB
D201	VHD1S1555V/1G	Time Constant (1S1555V)	AB
D202, D203	VHD1S1555V/1G	Un-lock Muting (1S1555V)	AB
D301	VHD1S1555V/1G	Battery Reverse Connecting Protector (1S1555V)	AB
D302	VHD1S1555V/1G	Clock Adjust (1S1555V)	AB
D401	VHVHV46-G//-1	Reverse Current Protector (HV46-G)	AB
D405, D406, D407	VHD1S1555V/1G	Reverse Current Protector (1S1555V)	AB
D408	VHD1S1555V/1G	Protector, Q415 (1S1555V)	AB
D409	VHD1S1555V/1G	Rectifier (1S1555V)	AB
D411	VHD1S1555V/1G	Linear Revision (1S1555V)	AB
D412	VHD1S1555V/1G	Reverse Current Protector (1S1555V)	AB
D414	VHD1S1555V/1G	APSS Mistake action Protecter (1S1555V)	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
D5, D105, D421, D422, D423, D424, D425, D426, D427, D428	VHPGL1110Z13-1	LED, FM Stereo/Station Tuning/VU-Battery Condition Meter/Recording/Power/APSS Indicator	AQ
D429	VHD1S1555V/1G	Reverse Current Protector (1S1555V)	AB
D430, D431	RH-DX1006AFZZ	Reverse Current Protector (10E1)	AB
D432	RH-DX1006AFZZ	Protector, Q415 (10E1)	AB
D433	VHPSEL301E/-1	LED, LCD Illumination (SEL301E)	AD
D434	VHD1S1555V/1G	0.7V Desend (1S1555V)	AB
D950	VHD1S1555V/1G	Reverse Current Protector (1S1555V)	AB
D951	VHD1S1555V/1G	Mixing Mic (1S1555V)	AB
D952	VHD1S1555V/1G	Mixing Mic (1S1555V)	AB
D953, D954	VHD1S1555V/1G	Switching (1S1555V)	AB
D955	VHD1S1555V/1G	APSS Prevent (1S1555V)	AB
D957	VHD1N60////-1	Power (1N60)	AB
ZENER DIODES			
ZD1	VHEEZ-056//1F	5.6V (Zener Voltage) (EZ-056)	AB
ZD410	VHEEZ-179//-1	17.9V (Zener Voltage) (EZ-179)	AB
TRANSFORMERS			
T1	RCILI0267AFZZ	Filter, 450kHz	AC
T2	RCILI0283AFZZ	Filter, 10.7MHz	AC
COILS			
L1	RCILA0489AFZZ	MW/LW Bar Antenna	AK
L2	VP-CH101K0000	Choke (100μH)	AB
L201	VP-CH221K0000	DC-DC Choke (220μH)	AB
L202	VP-CH470K0000	PLL +B Choke (47μH)	AB
L203	VP-CH470K0000	Choke (47μH)	AB
L401, L402	RCILB0473AFZZ	Step-up (Matched Pair)	AD
L403	RCILB0472AFZZ	DC-DC Converter	AD
L411, L412	RCILZ0088AFZZ	Record (8.2mH)	AC
L601	RCILB0518AFZZ	Bias, Oscillation	AF
L901	VP-CH470K0000	Motor Choke (47μH)	AB
CERAMIC FILTERS			
CF1, CF101	RFILA0062AFZZ	450kHz ±1kHz (Matched Pair)	AG
CF2	RFILF0078AFZZ	10.730MHz ±30kHz	AE
CF3	RFILF0082AFZZ	10.730MHz ±30kHz	AE

REF. NO.	PART NO.	DESCRIPTION	CODE
CONTROLS			
VR1	RVR-M0004SGZZ	10K(B) ohm, 19kHz Adjustment	AC
VR101	RVR-M0116AFZZ	1K(B) ohm, Auto Stop Level Adjustment	AC
VR102	RVR-M0004SGZZ	10K(B) ohm, Auto Stop Level Adjustment	AC
VR103	RVR-M0006SGZZ	50K(B) ohm, AM Scan Level Adjustment	AC
VR701, VR702	RVR-P0071AFZZ	20K(A) ohm, Tone	AH
VR703, VR704	RVR-Q0074AFZZ	20K(B) ohm, Volume	AG
VR705	RVR-P0077AFZZ	10K(A) ohm, MIX. MIC. Volume	AF
CRYSTAL			
XL201	RCRSB0068AFZZ	5.760MHz (Oscillation Frequency)	AK
XL301	RCRSP0051AFZZ	32.768kHz (Oscillation Frequency)	AK
TRIMMERS			
TC1	RTO-H1056AFZZ	MW Antenna	AC
TC2	RTO-H1060AFZZ	LW Antenna	AD
TC201	RTO-H1060AFZZ	PLL Reference Frequency Adjustment	AD
TC301	RTO-H1062AFZZ	Clok Reference Frequency Adjustment	AE
PACKAGED CIRCUIT			
M101	RMPTA0024AFZZ	470 ohm +.01MFD	AB
CAPACITORS			
C2	VCKZPU1HF103Z	.01MFD, 50V, +80 −20%, Ceramic	AA
C3	VCKZPU1HF103Z	.01MFD, 50V, +80 −20%, Ceramic	AA
C5	VCQYKU1HM103M	.01MFD, 50V, ±20%, Mylar	AB
C6	VCTYPU1EX103M	.01MFD, 25V, ±20%, Semiconductor	AA
C7	VCTYPU1EX223M	.022MFD, 25V, ±20%, Semiconductor	AB
C8	VCTYPU1EX103M	.01MFD, 25V, ±20%, Semiconductor	AA
C10	VCTYAT1EX103N	.01MFD, 25V, ±30%, Semiconductor	AA
C11	VCTYPU1EX333M	.033MFD, 25V, ±20%, Semiconductor	AB
C13	VCCSPU1HL270J	27PF, 50V, ±5%, Ceramic	AA
C15	VCTYAT1EX103N	.01MFD, 25V, ±30%, Semiconductor	AA
C16	VCCSPU1HL561J	560PF, 50V, ±5%, Ceramic	AA
C18	VCTYPU1EX822K	.0082MFD, 25V, ±10%, Semiconductor	AA

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
C19	VCTYPU1EX473M	.047MFD, 25V, ±20%, Semiconductor	AB
C20	VCCSAT1HL101J	100PF, 50V, ±5%, Ceramic	AA
C24	VCTYPU1EX223M	.022MFD, 25V, ±20%, Semiconductor	AB
C27	VCTYPU1EX473M	.047MFD, 25V, ±20%, Semiconductor	AB
C31	VCQSMT1HS681J	680PF, 50V, ±5%, Styrol	AB
C32	VCTYAT1EX103K	.01MFD, 25V, ±10%, Semiconductor	AA
C33	VCTYPU1EX103K	.01MFD, 25V, ±10%, Semiconductor	AA
C34	VCTYPU1EX472K	.0047MFD, 25V, ±10%, Semiconductor	AA
C35	VCTYAT1HV472K	.0047MFD, 50V, ±10%, Semiconductor	AA
C38	VCKZPU1HF223Z	.022MFD, 50V, +80 −20%, Ceramic	AA
C41	VCTYPU1EX333M	.033MFD, 25V, ±20%, Semiconductor	AB
C42	VCTYAT1HV472K	.0047MFD, 50V, ±10%, Semiconductor	AA
C43	VCTYAT1HV472K	.0047MFD, 50V, ±10%, Semiconductor	AA
C44	VCKYAT1HB471K	470PF, 50V, ±10%, Ceramic	AA
C45	VCKYAT1HB471K	470PF, 50V, ±10%, Ceramic	AA
C47	VCTYPU1EX333M	.033MFD, 25V, ±20%, Semiconductor	AB
C49	VCKYPU1HB151K	150PF, 50V, ±10%, Ceramic	AA
C50	VCCSAT1HL101J	100PF, 50V, ±5%, Ceramic	AA
C101	VCTYPU1EX333M	.033MFD, 25V, ±20%, Semiconductor	AB
C103	VCKZPU1HF102Z	.001MFD, 50V, +80 −20%, Ceramic	AA
C104	VCTYAT1EX103N	.01MFD, 25V, ±30%, Semiconductor	AA
C105	VCCSPU1HL471J	470PF, 50V, ±5%, Ceramic	AB
C106	VCKYPU1HB470K	47PF, 50V, ±10%, Ceramic	AA
C107	VCTYPU1EX103M	.01MFD, 25V, ±20%, Semiconductor	AA
C108	VCTYPU1EX103M	.01MFD, 25V, ±20%, Semiconductor	AA
C109	VCKYPU1HB151K	150PF, 50V, ±10%, Ceramic	AA
C201	VCKYPU1HB101K	100PF, 50V, ±10%, Ceramic	AA
C205	VCCSPU1HL820J	82PF, 50V, ±5%, Ceramic	AA
C206	VCKYPU1HB331K	330PF, 50V, ±10%, Ceramic	AA
C210	VCKZPU1HF102Z	.001MFD, 50V, +80 −20%, Ceramic	AA
C211	VCTYPU1EX103K	.01MFD, 25V, ±10%, Semiconductor	AA
C212	VCKYPU1HB101K	100PF, 50V, ±10%, Ceramic	AA
C213	VCKYPU1HB101K	100PF, 50V, ±10%, Ceramic	AA
C214	VCKYPU1HB101K	100PF, 50V, ±10%, Ceramic	AA
C215	VCTYPU1EX332K	.0033MFD, 25V, ±10%, Semiconductor	AA
C220	VCCSPU1HL150J	15PF, 50V, ±5%, Ceramic	AA
C301	VCCSPU1HL220J	22PF, 50V, ±5%, Ceramic	AA
C307, C308	VCTYPU1EX333M	.033MFD, 25V, ±20%, Semiconductor	AB
C411, C412	VCCSAT1HL330J	33PF, 50V, ±5%, Ceramic	AA
C413, C414	VCTYPU1EX122K	.0012MFD, 25V, ±10%, Semiconductor	AA
C417, C418	VCTYPU1EX183K	.018MFD, 25V, ±10%, Semiconductor	AA
C419, C420	VCTYAT1HV182K	.0018MFD, 50V, ±10%, Semiconductor	AA
C425	VCTYPU1EX223M	.022MFD, 25V, ±20%, Semiconductor	AB
C427, C428	VCTYPU1EX102K	.001MFD, 25V, ±10%, Semiconductor	AA
C431, C432	VCTYPU1EX153K	.015MFD, 25V, ±10%, Semiconductor	AA
C433, C434	VCTYPU1EX822K	.0082MFD, 25V, ±10%, Semiconductor	AA
C437	VCTYPU1EX392K	.0039MFD, 25V, ±10%, Semiconductor	AA
C438	VCTYPU1EX102K	.001MFD, 25V, ±10%, Semiconductor	AA
C439, C440	VCTYPU1EX222K	.0022MFD, 25V, ±10%, Semiconductor	AA
C441	VCTYPU1EX272K	.0027MFD, 25V, ±10%, Semiconductor	AA
C442	VCTYPU1EX272K	.0027MFD, 25V, ±10%, Semiconductor	AA
C445, C446	VCTYPU1EX272K	.0027MFD, 25V, ±10%, Semiconductor	AA
C447, C448	VCTYPU1EX683K	.068MFD, 25V, ±10%, Semiconductor	AB
C450	VCQYSH1HM104K	.1MFD, 50V, ±10%, Mylar	AC
C481	VCQYKU1HM103M	.01MFD, 50V, ±20%, Mylar	AB
C482	VCQYKU1HM223M	.022MFD, 50V, ±20%, Mylar	AB
C483	VCTYPU1EX473M	.047MFD, 25V, ±20%, Semiconductor	AB
C492	VCTYPU1EX102K	.001MFD, 25V, ±10%, Semiconductor	AA
C498, C499	VCTYPU1EX333K	.033MFD, 25V, ±10%, Semiconductor	AB
C500	VCTYPU1EX183K	.018MFD, 25V, ±10%, Semiconductor	AA
C513	VCKZPU1HF103Z	.01MFD, 50V, +80 −20% Ceramic	AA
C514	VCCSPU1HL221J	220PF, 50V, ±5%, Ceramic	AA
C601	VCQYKU1HM682J	.0068MFD, 50V, ±5%, Mylar	AB
C602	VCQYKU1HM223J	.022MFD, 50V, ±5%, Mylar	AB
C603	VCQPKQ2AA103J	.01MFD, 100V, ±5%, Oxide Film	AB
C604	VCQYKU1HM103J	.01MFD, 50V, ±5%, Mylar	AB
C605	VCQYKU1HM223K	.022MFD, 50V, ±10%, Mylar	AB
C607	VCKZPU1HF102Z	.001MFD, 50V, +80 −20%, Ceramic	AA
C608	VCQYKU1HM153J	.015MFD, 50V, ±5%, Mylar	AB
C907, C908	VCQYKU1HM154K	.15MFD, 50V, ±10%, Mylar	AC
C927, C929	VCCSPU1HL180J	18PF, 50V, ±5%, Ceramic	AA
C933, C934	VCTYPU1EX272K	.0027MFD, 25V, ±10%, Semiconductor	AA
C935, C936	VCKYAT1HB821K	820PF, 50V, ±10%, Ceramic	AA
C941, C942, C946	VCTYPU1EX683K	.068MFD, 25V, ±10%, Semiconductor	AB
C951, C952	VCTYPU1EX102K	.001MFD, 25V, ±10%, Semiconductor	AA
C990	VCTYPU1EX103M	.01MFD, 25V, ±20%, Semiconductor	AA
ELECTROLYTIC CAPACITORS			
C4	VCEALU1CW106M	10MFD, 16V, ±20%	AB
C9	RC-EZS107AF1A	100MFD, 10V, ±20%	AB
C12	VCEALU1HW105M	1MFD, 50V, ±20%	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
C17	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C21	RC-EZS476AF1A	47MFD, 10V, ±20%	AB
C22	RC-EZ1109AFZZ	4.7MFD, 25V, ±20%	AB
C25	VCEALU1CW106M	10MFD, 16V, ±20%	AB
C26	VCSATU1VF105M	1MFD, 35V, ±20%, Tantalum	AC
C28	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C29	VCAAKU1AA224M	.22MFD, 10V, ±20%, Alluminum	AB
C30	RC-EZ1115AFZZ	1MFD, 50V, ±20%	AD
C36, C37	RC-EZ1138AFZZ	.1MFD, 50V, ±20%	AB
C39	RC-EZS477AF0J	470MFD, 6.3V, ±20%	AC
C40	RC-EZS336AF1C	33MFD, 16V, ±20%	AB
C46	VCAAAU1EB104M	.1MFD, 25V, ±20%, Alluminum	AB
C48	RC-EZS476AF1A	47MFD, 10V, ±20%	AB
C102	VCSATU1VF104M	.1MFD, 35V, ±20%, Tantalum	AC
C202	VCAAAU1AB224M	.22MFD, 10V, ±20%, Alluminum	AB
C203	VCAAAU1AB104M	.1MFD, 10V, ±20%, Alluminum	AB
C204	VCE9AU1EW225M	2.2MFD, 25V, ±20%, Non Polar	AC
C207	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	AB
C208	VCEALU1HW334M	.33MFD, 50V, ±20%	AB
C209	RC-EZS107AF1A	100MFD, 10V, ±20%	AB
C302	VCSATU1VF105M	1MFD, 35V, ±10%, Tantalum	AC
C303	RC-EZ1106AFZZ	10MFD, 16V, ±20%	AE
C304	RC-EZ1101AFZZ	33MFD, 6.3V, ±20%	AB
C305	RC-EZ1106AFZZ	10MFD, 16V, ±20%	AE
C306	RC-EZ1106AFZZ	10MFD, 16V, ±20%	AE
C309	RC-EZ1115AFZZ	1MFD, 50V, ±20%	AD
C401, C402	VCEALU1HW334M	.33MFD, 50V, ±20%	AB
C403	RC-EZS107AF1A	100MFD, 10V, ±20%	AB
C407, C408	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	AB
C409, C410	RC-EZS476AF1A	47MFD, 10V, ±20%	AB
C421	RC-EZ1106AFZZ	10MFD, 16V, ±20%	AE
C422	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	AB
C423, C424	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C426	RC-EZS107AF1A	100MFD, 10V, ±20%	AB
C435, C436	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	AB
C443, C444	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C451, C452	VCAAAU1AB104M	.1MFD, 10V, ±20%, Alluminum	AB
C455, C456	VCAAKU1AA224M	.22MFD, 10V, ±20%, Alluminum	AB
C463	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C465, C466	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C471	RC-EZS476AF1A	47MFD, 10V, ±20%	AB
C472	VCEALU1HW474M	.47MFD, 50V, ±20%	AB
C473	RC-EZ1106AFZZ	10MFD, 16V, ±20%	AE
C474, C475	RC-EZS476AF1A	47MFD, 10V, ±20%	AB
C484	VCEAAU1EW475A	4.7MFD, 25V, +75 −10%	AB
C485	RC-EZS336AF1C	33MFD, 16V, ±20%	AB
C486	RC-EZS476AF1C	47MFD, 16V, ±20%	AB
C491	VCAAKU1AA334M	.33MFD, 10V, ±20%, Alluminum	AB
C493	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C494	RC-EZS227AF1A	220MFD, 10V, ±20%	AB
C496	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	AB
C497	VCEAAU1EW335A	3.3MFD, 25V, +75 −10%	AB
C501	RC-EZS476AF1A	47MFD, 10V, ±20%	AB
C502	RC-EZ1116AFZZ	2.2MFD, 50V, ±20%	AD
C503	VCEAAU1CW106Y	10MFD, 16V, +50 −10%	AB
C512	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C513	RC-EZ1106AFZZ	10MFD, 16V, ±20%	AE
C606	RC-EZS107AF1C	100MFD, 16V, ±20%	AB
C901	RC-EZ1075AFZZ	.1MFD, 16V, ±20%	AE
C902	RC-EZS107AF1A	100MFD, 10V, ±20%	AB
C903, C904	RC-EZS227AF1A	220MFD, 10V, ±20%	AB
C905, C906	RC-EZS476AF1A	47MFD, 10V, ±20%	AB
C909, C910	RC-EZS477AF1A	470MFD, 10V, ±20%	AC
C911	RC-EZS107AF1C	100MFD, 16V, ±20%	AB
C920	RC-EZS107AF1A	100MFD, 10V, ±20%	AB
C925, C926	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C930	RC-EZS477AF1A	470MFD, 10V, ±20%	AC
C931, C932	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C938	RC-EZS227AF1A	220MFD, 10V, ±20%	AB
C939	VCEAAU1HW105A	1MFD, 50V, +75 −10%	AB
C950	RC-EZ1106AFZZ	10MFD, 16V, ±20%	AE

RESISTORS

(Unless otherwise specified are 1/4W, ±5%, Carbon type.)

R1	VRD-ST2EE152J	1.5K ohm	AA
R2	VRD-ST2EE122J	1.2K ohm	AA
R3	VRD-SU2EE331J	330 ohm	AA
R4	VRD-SU2EE222J	2.2K ohm	AA
R5	VRD-ST2EE104J	100K ohm	AA
R6	VRD-SU2EE103J	10K ohm	AA
R7	VRD-SU2EE153J	15K ohm	AA
R8	VRD-ST2EE100J	10 ohm	AA
R9	VRD-SU2EE683J	68K ohm	AA
R10	VRD-ST2EE103J	10K ohm	AA
R11	VRD-ST2EE470J	47 ohm	AA
R14	VRD-ST2EE470J	47 ohm	AA
R15	VRD-ST2EE333J	33K ohm	AA
R16	VRD-SU2EE222J	2.2K ohm	AA
R17	VRD-ST2EE223J	22K ohm	AA
R18	VRD-SU2EE223J	22K ohm	AA
R20	VRD-SU2EE222J	2.2K ohm	AA
R23	VRD-ST2EE473J	47K ohm	AA
R24	VRD-SU2EE682J	6.8K ohm	AA
R25	VRD-ST2EE102J	1K ohm	AA
R26	VRD-ST2EE122J	1.2K ohm	AA
R27	VRD-ST2EE271J	270 ohm	AA
R28	VRD-ST2EE153J	15K ohm	AA
R29	VRD-ST2EE332J	3.3K ohm	AA
R30	VRD-ST2EE332J	3.3K ohm	AA
R31	VRD-ST2EE122J	1.2K ohm	AA
R32	VRD-ST2EE122J	1.2K ohm	AA
R33	VRD-ST2EE182J	1.8K ohm	AA
R34	VRD-ST2EE182J	1.8K ohm	AA
R35	VRD-ST2EE122J	1.2K ohm	AA
R36	VRD-ST2EE122J	1.2K ohm	AA
R37	VRD-ST2EE104J	100K ohm	AA
R38	VRD-SU2EE561J	560 ohm	AA

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
R41	VRD-ST2EE222J	2.2K ohm	AA
R42	VRD-SU2EE104J	100K ohm	AA
R43	VRD-ST2EE102J	1K ohm	AA
R44	VRD-ST2EE333J	33K ohm	AA
R45	VRD-ST2EE222J	2.2K ohm	AA
R101	VRD-SU2EE392J	3.9K ohm	AA
R102	VRD-SU2EE471J	470 ohm	AA
R104	VRD-SU2EE222J	2.2K ohm	AA
R105	VRD-SU2EE562J	5.6K ohm	AA
R106	VRD-ST2EE473J	47K ohm	AA
R107	VRD-ST2EE153J	15K ohm	AA
R108	VRD-ST2EE153J	15K ohm	AA
R109	VRD-ST2EE103J	10K ohm	AA
R110	VRD-ST2EE333J	33K ohm	AA
R111	VRD-ST2BB224J	220K ohm, 1/8W, ±5%, Carbon	AA
R113	VRD-SU2EE153J	15K ohm	AA
R114	VRD-ST2EE471J	470 ohm	AA
R115	VRD-SU2EE104J	100K ohm	AA
R116	VRD-SU2EE182J	1.8K ohm	AA
R117	VRD-SU2EE333J	33K ohm	AA
R118	VRD-SU2EE123J	12K ohm	AA
R119	VRD-SU2EE273J	27K ohm	AA
R122	VRD-ST2EE333J	33K ohm	AA
R123	VRD-ST2EE562J	5.6K ohm	AA
R124	VRD-ST2BB223J	22K ohm, 1/8W, ±5%, Carbon	AA
R201	VRD-ST2EE103J	10K ohm	AA
R202	VRD-ST2EE103J	10K ohm	AA
R203	VRD-SU2BB823J	82K ohm, 1/8W, ±5%, Carbon	AA
R204	VRD-SU2EE472J	4.7K ohm	AA
R205	VRD-ST2EE152J	1.5K ohm	AA
R206	VRD-SU2EE472J	4.7K ohm	AA
R207	VRD-SU2EE334J	330K ohm	AA
R208	VRD-SU2EE474J	470K ohm	AA
R209	VRD-SU2EE562J	5.6K ohm	AA
R210	VRD-ST2EE152J	1.5K ohm	AA
R211	VRD-SU2EE103J	10K ohm	AA
R212	VRD-ST2EE102J	1K ohm	AA
R215	VRD-SU2BB823J	82K ohm, 1/8W, ±5%, Carbon	AA
R216	VRD-SU2BB823J	82K ohm, 1/8W, ±5%, Carbon	AA
R301	VRD-ST2BB562J	5.6K ohm, 1/8W, ±5%, Carbon	AA
R302	VRD-ST2BB223J	22K ohm, 1/8W, ±5%, Carbon	AA
R303	VRD-ST2BB223J	22K ohm, 1/8W, ±5%, Carbon	AA
R304	VRD-ST2BB223J	22K ohm, 1/8W, ±5%, Carbon	AA
R305	VRD-ST2BB224J	220K ohm, 1/8W, ±5%, Carbon	AA
R306	VRD-ST2BB564J	560K ohm, 1/8W, ±5%, Carbon	AA
R307	VRD-ST2BB564J	560K ohm, 1/8W, ±5%, Carbon	AA
R308	VRD-ST2BB564J	560K ohm, 1/8W, ±5%, Carbon	AA
R309	VRD-ST2BB104J	100K ohm, 1/8W, ±5%, Carbon	AA
R310	VRD-ST2BB104J	100K ohm, 1/8W, ±5%, Carbon	AA
R311	VRD-ST2BB823J	82K ohm, 1/8W, ±5%, Carbon	AA
R312	VRD-ST2BB104J	100K ohm, 1/8W, ±5%, Carbon	AA
R313	VRD-ST2BB104J	100K ohm, 1/8W, ±5%, Carbon	AA
R314	VRD-ST2BB104J	100K ohm, 1/8W, ±5%, Carbon	AA
R315	VRD-ST2BB473J	47K ohm, 1/8W, ±5%, Carbon	AA
R316	VRD-ST2BB224J	220K ohm, 1/8W, ±5%, Carbon	AA
R317	VRD-ST2BB224J	220K ohm, 1/8W, ±5%, Carbon	AA
R318	VRD-ST2EE101J	100 ohm	AA
R319	VRD-ST2BB104J	100K ohm, 1/8W, ±5%, Carbon	AA
R320	VRD-ST2BB104J	100K ohm, 1/8W, ±5%, Carbon	AA
R321	VRD-ST2BB104J	100K ohm, 1/8W, ±5%, Carbon	AA
R401	VRD-ST2EE101J	100 ohm	AA
R402	VRD-ST2EE101J	100 ohm	AA
R403	VRD-SU2EE222J	2.2K ohm	AA
R404	VRD-SU2EE222J	2.2K ohm	AA
R405	VRD-SU2EE103J	10K ohm	AA
R406	VRD-SU2EE103J	10K ohm	AA
R407	VRD-ST2EE472J	4.7K ohm	AA
R408	VRD-ST2EE102J	1K ohm	AA
R414	VRD-ST2EE682J	6.8K ohm	AA
R417	VRD-SU2EE222J	2.2K ohm	AA
R418	VRD-SU2EE222J	2.2K ohm	AA
R421	VRD-ST2EE563J	56K ohm	AA
R422	VRD-ST2EE563J	56K ohm	AA
R423	VRD-ST2EE332J	3.3K ohm	AA
R425	VRD-ST2BB102J	1K ohm, 1/8W, ±5%, Carbon	AA
R426	VRD-ST2BB102J	1K ohm, 1/8W, ±5%, Carbon	AA
R427	VRD-ST2EE562J	5.6K ohm	AA
R428	VRD-SU2EE562J	5.6K ohm	AA
R429	VRD-ST2EE392J	3.9K ohm	AA
R430	VRD-ST2EE392J	3.9K ohm	AA
R431	VRD-SU2EE224J	220K ohm	AA
R432	VRD-SU2EE224J	220K ohm	AA
R433	VRD-SU2EE332J	3.3K ohm	AA
R434	VRD-ST2EE332J	3.3K ohm	AA
R435	VRD-SU2EE682J	6.8K ohm	AA
R436	VRD-ST2EE682J	6.8K ohm	AA
R437	VRD-ST2EE121J	120 ohm	AA
R438	VRD-ST2EE121J	120 ohm	AA
R439	VRD-SU2EE152J	1.5K ohm	AA
R440	VRD-SU2EE152J	1.5K ohm	AA
R441	VRD-ST2EE393J	39K ohm	AA
R442	VRD-ST2EE393J	39K ohm	AA
R443	VRD-ST2EE333J	33K ohm	AA
R444	VRD-ST2EE333J	33K ohm	AA
R445	VRD-ST2BB103J	10K ohm, 1/8W, ±5%, Carbon	AA
R446	VRD-ST2BB103J	10K ohm, 1/8W, ±5%, Carbon	AA
R447	VRD-ST2BB682J	6.8K ohm, 1/8W, ±5%, Carbon	AA
R448	VRD-ST2BB682J	6.8K ohm, 1/8W, ±5%, Carbon	AA
R449	VRD-ST2EE272J	2.7K ohm	AA
R450	VRD-ST2EE272J	2.7K ohm	AA

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
R451	VRD-ST2EE182J	1.8K ohm	
R452	VRD-ST2EE182J	1.8K ohm	
R453	VRD-ST2EE393J	39K ohm	
R454	VRD-ST2EE393J	39K ohm	
R455	VRD-ST2EE682J	6.8K ohm	
R456	VRD-ST2EE682J	6.8K ohm	
R457	VRD-ST2EE103J	10K ohm	
R458	VRD-ST2EE103J	10K ohm	
R459	VRD-SU2EE123J	12K ohm	
R460	VRD-SU2EE682J	6.8K ohm	
R461	VRD-SU2EE824J	820K ohm	
R462	VRD-ST2EE473J	47K ohm	
R463	VRD-ST2EE222J	2.2K ohm	
R464	VRD-ST2EE683J	68K ohm	
R466	VRD-SU2EE183J	18K ohm	
R467	VRD-SU2EE682J	6.8K ohm	
R468	VRD-ST2EE331J	330 ohm	
R469	VRD-ST2EE331J	330 ohm	
R470	VRD-ST2EE332J	3.3K ohm	
R471	VRD-ST2EE332J	3.3K ohm	
R472	VRD-ST2EE334J	330K ohm	
R473	VRD-SU2EE221J	220 ohm	
R475	VRD-ST2EE681J	680 ohm	
R491	VRD-ST2EE822J	8.2K ohm	
R492	VRD-ST2EE822J	8.2K ohm	
R493	VRD-ST2EE222J	2.2K ohm	
R494	VRD-ST2EE222J	2.2K ohm	
R495	VRD-ST2EE680J	68 ohm	
R496	VRD-ST2EE682J	6.8K ohm	
R501	VRD-ST2EE220J	22 ohm	
R502	VRD-ST2EE122J	1.2K ohm	
R503	VRD-ST2EE101J	100 ohm	
R504	VRD-ST2EE122J	1.2K ohm	AA
R505	VRD-ST2EE224J	220K ohm	
R506	VRD-ST2EE820J	82 ohm	
R507	VRD-SU2EE562J	5.6K ohm	
R508	VRD-ST2EE473J	47K ohm	
R509	VRD-ST2EE103J	10K ohm	
R510	VRD-SU2EE224J	220K ohm	
R511	VRD-ST2EE272J	2.7K ohm	
R512	VRD-SU2EE560J	56 ohm	
R513	VRD-ST2HA2R2J	2.2 ohm, 1/2W, ±5%, Carbon	
R514	VRD-SU2EE102J	1K ohm	
R517	VRD-SU2EE681J	680 ohm	
R518	VRD-ST2EE102J	1K ohm	
R519	VRD-ST2EE471J	470 ohm	
R520	VRD-SU2EE333J	33K ohm	
R521	VRD-ST2EE680J	68 ohm	
R522	VRD-SU2EE154J	150K ohm	
R523	VRD-ST2EE104J	100K ohm	
R524	VRD-SU2EE332J	3.3K ohm	
R525	VRD-SU2EE103J	10K ohm	
R526	VRD-SU2EE102J	1K ohm	
R527	VRD-SU2EE332J	3.3K ohm	
R528	VRD-SU2EE331J	330 ohm	
R529	VRD-SU2EE152J	1.5K ohm	
R530	VRD-ST2EE393J	39K ohm	
R531	VRD-ST2EE473J	47K ohm	
R533	VRD-ST2HA2R2J	2.2 ohm, 1/2W, ±5%, Carbon	
R538	VRD-SU2EE102J	1K ohm	
R541	VRD-SU2EE682J	6.8K ohm	
R542	VRD-SU2BB103J	10K ohm, 1/8W, ±5%, Carbon	
R543	VRD-ST2EE153J	15K ohm	
R544	VRD-ST2EE682J	6.8K ohm	
R601	VRD-SU2EE100J	10 ohm	
R602	VRD-SU2EE100J	10 ohm	
R603	VRD-ST2EE822J	8.2K ohm	
R901	VRD-ST2EE101J	100 ohm	
R902	VRD-ST2EE101J	100 ohm	
R903	VRD-ST2EE152J	1.5K ohm	
R904	VRD-ST2EE101J	100 ohm	
R905	VRD-SU2EE684J	680K ohm	
R906	VRD-SU2EE684J	680K ohm	
R907	VRD-ST2EE562J	5.6K ohm	
R908	VRD-ST2EE562J	5.6K ohm	
R909	VRD-ST2EE272J	2.7K ohm	
R910	VRD-ST2EE272J	2.7K ohm	
R911	VRD-SU2EE223J	22K ohm	
R912	VRD-ST2EE223J	22K ohm	
R913	VRD-ST2EE681J	680 ohm	
R914	VRD-SU2EE104J	100K ohm	AA
R915	VRD-SU2EE332J	3.3K ohm	
R916	VRD-SU2EE332J	3.3K ohm	
R917	VRD-ST2EE471J	470 ohm	
R918	VRD-SU2EE103J	10K ohm	
R919	VRD-SU2EE103J	10K ohm	
R920	VRD-ST2EE824J	820K ohm	
R921	VRD-ST2EE103J	10K ohm	
R922	VRD-ST2EE103J	10K ohm	
R923	VRD-SU2EE824J	820K ohm	
R924	VRD-SU2EE222J	2.2K ohm	
R925	VRD-SU2EE333J	33K ohm	
R926	VRD-ST2EE270J	27 ohm	
R927	VRD-ST2EE333J	33K ohm	
R928	VRD-ST2EE333J	33K ohm	
R930	VRD-ST2EE471J	470 ohm	
R931	VRD-ST2EE104J	100K ohm	
R970	VRD-ST2EE154J	150K ohm	
R971	VRD-ST2EE154J	150K ohm	

MECHANICAL PARTS

1	LCHSM0330AFZZ	Main Chassis	
2	LANGF0552AFZZ	Bracket, Lock Lever	AC
3	MLEVF1032AFFW	Lever, Lock	AB
4	JKNBR0134AFSA	Key, Record	AF
5	JKNBR0136AFSA	Key, Rewind	AE
6	JKNBR0135AFSA	Key, Fast-forward	AE
7	JKNBR0137AFSA	Key, Pause	AE
8	JKNBR0138AFSA	Key, Stop/Eject	AE
9	MSPRT0635AFFJ	Spring, Eject Prevent Spring	AA
10	MLEVF1029AFFW	Lever, Eject Prevent	AD
11	MSPRT0638AFFJ	Spring, Record Prevent	AA
12	MLEVF1030AFZZ	Lever, Record Prevent	AC
13	LSLVM0088AFFW	Spacer	AB
14	MSPRT0629AFFJ	Spring, Lock Lever	AA
15	MSPRT0632AFFJ	Spring, Sub Chassis Return	AA
16	MSPRC0207AFFJ	Spring, Head Azimuth	AA
17	MSPRC0205AFFJ	Spring, Eject Solenoid	AA
18	LANGF0549AFZZ	Bracket, Eject Solenoid	AE
19	MSPRD0259AFFJ	Spring, Fast-forward/Rewind	AA
20	MLEVF1020AFFW	Lever, Record	AC
21	MLEVF1021AFZZ	Lever, Fast-forward	AD
22	MLEVF1031AFZZ	Lever, Play Lock	AC
23	MLEVF1022AFZZ	Lever, Rewind	AD
24	MLEVF1023AFZZ	Lever, Pause	AD
25	MSPRT0630AFFJ	Spring, Pause Lever	AA
26	MLEVF1024AFZZ	Lever, Stop	AD
27	MLEVF1033AFFW	Lever, Head Retaining Chassis	AB

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
28	MSPRD0255AFFJ	Spring, Fast-forward/Rewind	AA
29	MLEVF1026AFZZ	Lever, Idler Release	AD
30	MSPRD0257AFFJ	Spring, Idler Release Lever	AA
31	MLEVF1019AFZZ	Lever, Fast-forward/Rewind	AE
32	RMOTV0083AFZZ	Motor	AX
33	PGUMM0140AF00	Cushion, Motor	AB
34	MLEVP0174AFZZ	Lever, Sub Chassis Operation	AB
35	LX-BZ0215AFZZ	Screw, Flywheel Thrust	AB
36	LCHSZ0073AFZZ	Sub Chassis Assembly	AW
36-1	MLEVF1027AFFW	Lever, Pause Connecting	AC
36-2	MSPRD0256AFFJ	Spring, Gear Ass'y Pressure	AA
36-3	MSPRT0631AFFJ	Spring, Gear Ass'y	AA
36-4	MSPRT0636AFFJ	Spring, Play Idler	AA
36-5	NBRGC0066AFZZ	Capstan Metal	AB
36-6	NPLYR0069AFZZ	Pulley, Gear Ass'y	AB
36-7	NDAIR0140AFSA	Turntable, Supply	AG
36-8	NDAIR0141AFSA	Turntable, Take-up	AF
36-9	NIDR-0069AFZZ	Play Idler	AF
36-10	NROLV0012AFZZ	Gear Ass'y	AH
36-11	LCHSM0331AFZZ	Sub Chassis	
●36-12	MSPRT0718AFFJ	Spring, Pause Connecting Lever	AB
37	MSPRP0233AFFW	Spring, Head Retaining Chassis	AA
38	PGUMM0141AF00	Cushion, Turntable Belt Protector	AA
39	LCHSS0151AFZZ	Chassis, Head Retaining	
40	MSPRD0258AFFJ	Spring, Pause Lock Plate	AA
41	MLEVF1028AFFD	Pause Lock Plate	AB
42	NBLTK0156AFZZ	Belt, Fast-forward/Rewind	AB
43	NBLTK0155AFZZ	Belt, Flywheel	AC
44	MSPRT0634AFFJ	Spring, Pressure Roller	AA
45	MLEVF1025AFFW	Lever, Cassette Eject	AC
46	NFLYC0081AFZZ	Flywheel	AH
47	LANGF0548AFFW	Bracket, Flywheel	AC
48	NPLYR0070AFZZ	Pulley, Magnet	AE
49	NBLTK0157AFZZ	Belt, Tape Counter	AB
50	NROLY0033AFZZ	Pressure Roller	AF
51	LANGF0550AFZZ	Bracket, Tape Counter	AH
52	MSPRT0633AFFJ	Spring, Sub Chassis	AA
53	PGUMM0111AF00	Cushion, Sub Chassis Touch	AB
54	MLEVF1034AFFW	Lever, Lock Release	AB
55	MSPRT0646AFFJ	Spring, Lock Release Lever	AA
56	MLEVP0172AFZZ	Lever, Cassette Eject (Right)	AB
57	MLEVP0171AFZZ	Lever, Cassette Eject (Left)	AB
58	KCOUB0093AFZZ	Tape Counter (GF-8HL)	AM
	KCOUB0095AFZZ	Tape Counter (GF-8H/E)	AM
59	NBLTM0051AFZZ	Belt, Turntable	AC
60	NROLP0057AFZZ	Gear, Play	AB
61	LANGF0551AFFW	Bracket, Sub Chassis Touch	AB
62	LANGF0553AFZZ	Bracket, Record Connecting Lever	AD
63	MLEVP0173AFZZ	Lever, Record Connecting	AB
64	MSPRT0637AFFJ	Spring, Record Connecting	AA
65	PGIDM0077AFSA	Cassette Guide (Left)	AC
66	PGIDM0078AFSA	Cassette Guide (Right)	AC
67	MSPRT0639AFFJ	Spring, Cassette Eject	AA
68	RHEDH0086AFZZ	Head, Record/Playback	AR
69	RHEDA0076AFZZ	Head, Erase	AM
70	LSLVM0087AFFW	Rubber spacer, Motor	AA
71	LANGF0562AFFW	Bracket, Tape Counter Strengthen	AC
72	HDECA0396AFSA	Decoration Plate, Cassette Compartment (GF-8HL)	AE
	HDECA0396AFSB	Decoration Plate, Cassette Compartment (GF-8H/E)	AE
73	LANGF0576AFFW	Bracket, Tape Counter Retaining	AD
74	MSPRP0234AFFW	Spring, Cassette Guide (Large)	AC
75	MSPRP0239AFFW	Spring, Cassette Guide (Small)	AC

MISCELLANEOUS PARTS

REF. NO.	PART NO.	DESCRIPTION	CODE
101	GCAB-1061AFSA	Front Cabinet Assembly (GF-8H/E)	BF
	GCAB-1062AFSA	Front Cabinet Assembly (GF-8HL)	BF
101-1	GCABA1525AFSB	Cabinet, Front (GF-8H/E)	AS
	GCABA1525AFSA	Cabinet, Front (GF-8HL)	AS
101-2	GWAKP9037AFSA	Panel, Controls (GF-8H/E)	AH
	GWAKP9037AFSB	Panel, Controls (GF-8HL)	AH
101-3	GWAKP9041AFSA	Panel, Push Switches (GF-8H/E)	AH
	GWAKP9041AFSB	Panel, Push Switches (GF-8HL)	AH
101-4	HDECA0412AFSA	Decoration Plate, Top Cabinet (GF-8H/E)	AY
	HDECA0412AFSB	Decoration Plate, Top Cabinet (GF-8HL)	AY
101-5	LANGT0926AFFW	Bracket, Top Cabinet Retaining	AB
●101-6	PGUMS0140AF00	Cushion, Panel	AB
103	GCABB1525AFSA	Rear Cabinet (GF-8HL)	AS
	GCABB1525AFSB	Rear Cabinet (GF-8H/E)	AS
104	GCOVA1191AFSA	Cover, Heads (GF-8HL)	AF
	GCOVA1191AFSB	Cover, Heads (GF-8H/E)	AF
105	GCOVA1192AFSA	Cover, Keys Gap (GF-8HL)	AA
	GCOVA1192AFSB	Cover, Keys Gap (GF-8H/E)	AA
106	GCOVA3057AF00	Cover, LED	AE
107	GCOVA9055AF03	Jack Plate (GF-8H/E)	AG
	GCOVA9056AF00	Jack Plate (GF-8HL)	AG
108	GFTAB1117AFSA	Lid, Battery Compartment (GF-8HL)	AD
	GFTAB1117AFSB	Lid, Battery Compartment (GF-8H/E)	AD
109	GFTAC3064AFSA	Lid, Cassette Compartment (GF-8HL)	AF
	GFTAC3064AFSB	Lid, Cassette Compartment (GF-8H/E)	AF
110	GFTAT1050AFSB	Lid, Controls Compartment (GF-8H/E)	AK
	GFTAT1050AFSC	Lid, Controls Compartment (GF-8HL)	AP
111	RTUNV0066AFZZ	FM Tuner Unit	AX
112	RTUNV0068AFZZ	LW/MW Tuner Unit	BE
113	HBDGZ3051AFSA	Decoration Plate, Metal	AD
116	HDECB0126AFSA	Decoration Plate, LCD	AB
117	HINDP0229AFSA	Serial No. Plate (GF-8H)	AC
	HINDP0231AFSA	Serial No. Plate (GF-8HL)	AC
	HINDP0232AFSA	Serial No. Plate (GF-8E)	AC
118	HPNLZ1053AFSA	Transparent Plate, Cassette (GF-8HL)	AG
	HPNLZ1053AFSB	Transparent Plate, Cassette (GF-8H/E)	AG
119	HPNLZ1054AFSA	Panel, Multi-display	AG
120	HPNLZ1055AFSA	Panel, Indicator	AG
121	JHNDG1070AFSA	Handle (GF-8HL)	AT
	JHNDG1070AFSB	Handle (GF-8H/E)	AT
122	JKNBM0342AFSA	Knob, Power	AD
123	JKNBM0343AFSA	Knob, APSS Mode/MW/FM/LW/Radio Sensitivity	AD

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
124	JKNBP0101AFSA	Knob, Microphone Input Control/Tone Control	AD
125	JKNBP0102AFSA	Knob, Tape Selector/Stereo Mode Selector	AD
126	JKNBP0107AFSA	Knob, Right/Left Channel Control	AD
127	JKNBZ0180AFSA	Button, Number/Memory/ Clock-radio (GF-8HL)	AB
	JKNBZ0180AFSB	Button, Number/Memory/ Clock-radio (GF-8H/E)	AB
128	JKNBZ0181AFSA	Button, Up-minute/Stop/ Down-hour (GF-8HL)	AB
	JKNBZ0181AFSB	Button, Up-minute/Stop/ Down-hour (GF-8H/E)	AB
129	JKNBZ0182AFSA	Button, Auto Memory/Clock Adjust (GF-8HL)	AB
	JKNBZ0182AFSB	Button, Auto Memory/Clock Adjust (GF-8H/E)	AB
130	JKNBZ0184AFSA	Button, Battery/Light	AD
131	LANGZ0082AFZZ	Bracket, Handle Retaining	AA
132	LANGQ0751AFFW	Bracket, LCD P.W.B.	AD
133	LANGQ0753AFFW	Bracket, Controls	AE
134	LANGS0021AFFW	Bracket, Speakers	AA
136	LANGT0989AFFW	Bracket, Jacks	
137	LANGT0928AFFW	Bracket, Heads Cover Retaining	AA
138	LHLDF1242AF00	Holder, Switch P.W.B	AE
139	LHLDZ1116AFSA	Holder, LCD (GF-8HL)	AC
	LHLDZ1116AFSB	Holder, LCD (GF-8H/E)	AE
140	LHLDZ9058AFSA	Holder, Controls Compartment Lid (GF-8HL)	AB
	LHLDZ9058AFSB	Holder, Controls Compartment Lid (GF-8H/E)	AB
141	LX-BZ0283AFSA	Screw, Protruding (GF-8HL)	AE
	LX-BZ0283AFSB	Screw, Protruding (GF-8H/E)	AE
142	LX-CZ0005AFFF	Screw, Cabinet Rear (GF-8HL)	AA
	LX-CZ0005AFFN	Screw, Cabinet Rear (GF-8H/E)	AA
143	LX-LZ0051AF00	Push Rivet	AA
144	MLEVP0175AF00	Stopper, Buttons (Small)	AB
145	MLEVP0176AF00	Stopper, Buttons (Large)	AB
146	MRODM0070AFFW	Rod, Cassette Compartment Lid	AA
147	MSPRC0118AFFW	Spring, Battery (Large)	AB
148	MSPRC0188AFFJ	Spring, Battery (Small)	AB
149	MSPRC0208AFFJ	Spring, Buttons	AA
151	MSPRD0260AFFJ	Spring, Cassette Compartment Lid	AA
153	MSPRP0235AFFW	Spring, Battery/Light Button	AA
155	PCOVM9050AF00	Cover, Controls (GF-8HL)	AB
	PCOVM9051AF08	Cover, Controls (GF-8H/E)	AB
156	PCOVU7119AF00	Felt, Battery/Light Button	AA
157	PCOVU7120AF00	Cover, Shade a Light	AA
159	PCOVZ1054AF00	Cover, Battery	AB
160	PCUSU0092AG00	Cushion, Battery Compartment	AA
161	PCUSU0238AFZZ	Cushion, Heads Cover Bracket	AA
162	PFILZ0052CHZZ	Filter, LCD	
163	PFLT-0130AGZZ	Felt, Cassette Compartment	AA
164	PFLT-0409AF00	Felt, Battery Compartment	AA
167	PREFL0074AFSA	Illumination Plate, LCD	AE
168	PREFL0079AFZZ	Reflection Plate, LCD	AB
169	PSLDM1101AFZZ	Shield Plate, Switch P.W.B	AC
170	PSLDM3174AFFW	Shield Plate, OSC Circuit	AC
171	PSLDM7122AFZZ	Shield Plate, Rear Cabinet (GF-8HL)	AC
	PSLDM7127AFZZ	Shield Plate, Rear Cabinet (GF-8H/E)	AC

REF. NO.	PART NO.	DESCRIPTION	CODE
172	PSPAB0122AFFW	Spacer, LED P.W.B	AB
173	PSPAG0079AFZZ	Spacer, Rubber	AA
174	PSPAH0051AFZZ	Felt, LED	AA
175	PTPEC0013AF00	Ribbon, Battery	
176	QCNTF0006AFZZ	Rubber Spacer, LCD	AG
177	QANTR0114AFZZ	Lod Antenna	AM
178	QTANR0157AFFN	Terminal, UM/SUM-1 Battery	AB
179	QTANB9107AFFN	Terminal, UM/SUM-3 Battery	AC
180	QCNTM0001AFZZ	Rubber Switch	AG
181	RV-LX0001AFZZ	LCD (Multi Display)	AV
182	QPLGZ0601AFZZ	Plug, 6 Pin	AD
183	QPLGZ0650AFZZ	Plug, 6 Pin	AC
184	QPLGZ1250AFZZ	Plug, 12 Pin	AD
185	RMICC0076AFZZ	Built-in Microphone	AF
186	QCNW-0874AFZZ	Flat Cable, 13 Pin	AG
187	QCNW-0694AFZZ	Flat Cable, 5 Pin	AB
188	QCNW-0922AFZZ	Flat Cable, 7 Pin	AF
189	QCNW-0860AFZZ	Flat Cable, 6 Pin	AD
190, 191	QCNW-0920AFZZ	Flat Cable, 3 Pin	AD
192	LPINS0051AFFD	Pin, Handle Lock	AA
SW1, SW2, SW3, SW4, SW411	QSW-P9111AFZZ	Switch, Radio/LW/MW/FM/ APSS Mode Sensitivity	AN
SW401 (A ~ G)	QSW-S0269AFZZ	Switch, Record/Playback	AE
SW402 (A ~ E)	QSW-S0274AFZZ	Switch, Tape Selector	AF
SW406	QSW-P9130AFZZ	Switch, Power	AF
	QSW-P9128AFZZ	Switch Power	
SW407	QSW-F0150AFZZ	Switch, APSS	AE
SW408	QSW-F0138AFZZ	Switch, Mechanism	AE
SW410	QSW-F0137AFZZ	Switch, Pause	AE
SW412	QSW-Z0078AFZZ	Switch, Battery Check/Dial Illumination	AC
SW413 (A ~ C)	QSW-S0275AFZZ	Switch, Stereo Mode Selector	AF
SW414	QSW-S0267AFZZ	Switch, Beat Cancelling	AD
J401, SW415	QJAKE0064AFZZ	Socket, External Microphone (L)	AE
J402, SW416	QJAKE0064AFZZ	Socket, External Microphone (R)	AE
J403, SW404	QJAKE0064AFZZ	Socket, Mixing Microphone	AE
J404	QJAKC0055AFZZ	Jack, DC 9V	AD
J405, SW409 (A, B)	QJAKJ0078AFZZ	Socket, Headphones	AG
J701, SW403	QSOCD2554AFZZ	Socket, DIN Type Input/ Output (AMP)	AF
SO401, SO402	QJAKE0065AFZZ	Socket, External Speaker	AC
CNP1	QCNCM131BAFZZ	Plug, 2 Pin	AC
CNP2	QCNCM112DAFZZ	Plug, 4 Pin	AC
CNP3	QCNCM115GAFZZ	Plug, 7 Pin	AC
CNP101	QCNCM0705SGZZ	Plug, 7 Pin	AH
CNP401, CNP402	QCNCM112DAFZZ	Plug, 4 Pin	AC
CNP404	QCNCM131BAFZZ	Plug, 2 Pin	AC
CNP405	QCNCM0411SGZZ	Plug, 4 Pin	AD
CNP406	QCNCM219HAFZZ	Plug, 8 Pin	AC
CNP407	QCNCM398BAFZZ	Plug, 2 Pin	AB
CNS1	QCNW-0945AFZZ	Socket, 2 Pin	
CNS2	QCNW-0918AFZZ	Socket, 4 Pin	AE

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	CODE
CNS3-1	QCNW-0863AFZZ	Socket, 3 Pin	AD
CNS3-2	QCNW-0894AFZZ	Socket, 3 Pin	AE
CNS101	QCNW-0918AFZZ	Socket, 7 Pin	AE
CNS401, CNS402	QCNW-0697AFZZ	Socket, 4 Pin	AK
CNS404	QCNW-0895AFZZ	Socket, 2 Pin	AF
CNS405	QCNW-0921AFZZ	Socket, 4 Pin	AE
CNS406	QCNW-0705AFZZ	Socket, 8 Pin	AH
CNS407	QCNW-0919AFZZ	Socket, 2 Pin	AD
SP1, SP2	VSP0090PB064A	Speakers	AP
SOL401, SOL402	RPLU-0107AFZZ	Solenoid	AK
	SPAKA0627AFZZ	Packing Add.	AD
	SPAKA0628AFZZ	Packing Add.	AD
	SPAKC1589AFZZ	Packing Case (GF-8H)	AR
	SPAKC1591AFZZ	Packing Case (GF-8HL)	AR
	SPAKC1592AFZZ	Packing Case (GF-8E)	AR
	SPAKP0130AFZZ	Wrapping Paper	AC
	SPAKX0294AFZZ	Packing Add, Cassette Compartment	AC
	SPAKX0319AFZZ	Packing Add, Packing Case (GF-8H/HL/E)	AD
	SSAKA0035AFZZ	Polyethylene Bag	AA
	TINSZ0251AFZZ	Instruction Book (GF-8H/HL)	AK
	TINSE0687AFZZ	Instruction Book (GF-8E)	

REF. NO.	PART NO.	DESCRIPTION	CODE
	TINSZ0252AFZZ	Instruction Book (GF-8H/HL)	AK
	RADPA7054AFZZ	AC Adaptor (AC 220V, only 50/60Hz)	BE
⚠	RADPA7057AFZZ	AC Adaptor (AC 110/220/240V, Switchable, 50/60Hz universal type)	BE
	RADPA7058AFZZ	AC Adaptor (AC240V, 50Hz) UK	BE
	QPLGZ0152AFZZ	Erasing Plug	AB

P.W.B. ASSEMBLY (not replacement item)

DUNTK0079AF02 (Combined Assembly)	Power Output Circuit/LED Circuit/Switch Circuit	
DUNTL0127AF02 (Combined Assembly)	Main Circuit	
DUNTT0057AF02 (Combined Assembly)	Control Circuit	
DUNTX0031AF04 (Combined Assembly)	Microcomputor Circuit (GF-8H/E)	
DUNTX0031AF06 (Combined Assembly)	Microcomputor Circuit (GF-8HL)	
DUNTW0019AF01 (Combined Assembly)	Switch Circuit	

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